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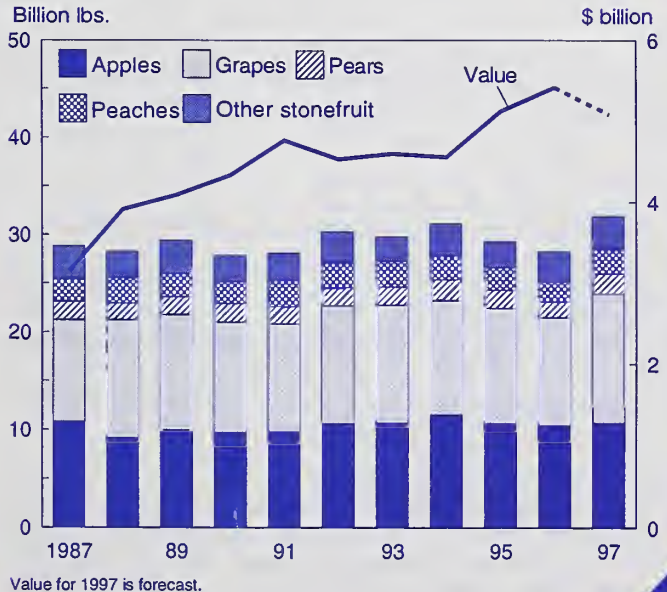
Fruit and Tree Nuts

Situation and Outlook Report

U.S. Production and Value of Selected Noncitrus Fruit



Value for 1997 is forecast.

Fruit and Tree Nuts Situation and Outlook. Commercial Agriculture Division, Economic Research Service, U.S. Department of Agriculture, August 1997, FTS-280.

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Summary

Grower prices for many noncitrus and citrus fruits are likely to stay lower than a year ago for the remainder of 1997 and into 1998. Several key Western States are harvesting larger crops of grapes and pears this fall, U.S. apple production is expected to increase, and conditions are favorable for another large orange and grapefruit crop for the 1997/98 season. During the first 7 months of 1997, the grower price index for fruit and nuts averaged 8 percent below a year earlier. The decline was due mainly to a larger Washington apple crop of mostly smaller-sized fruit last fall, a record large Florida orange crop and a large U.S. grapefruit crop in 1996/97, and an abundant harvest of summer stone fruits and grapes this year. Lower almond prices in 1996/97 also influenced the price index.

U.S. apple production is forecast to increase 3 percent from 1996. A smaller Washington crop will be offset by increases in most apple-producing States, including New York and Michigan. Production is forecast down 3 percent from a year ago in the Western States, but up 5 percent and 37 percent, respectively, in the Eastern and Central States. Reduced production in Washington will likely keep fresh-market grower prices unchanged to slightly higher than a year ago and will probably limit U.S. fresh apple exports in 1997/98.

U.S. grape production is forecast up 20 percent from last year, surpassing the record crop of 1982. California's grape output is expected to be up 20 percent, with production of wine-grape varieties up 21 percent and the largest on record. Production of raisin-grape and table-grape varieties is expected up 19 percent and 18 percent, respectively. The bountiful harvest will likely put some downward pressure on grower prices, but the good quality of the crop and continued strong domestic and export demand will likely prevent a steep decline in prices.

The 1997 U.S. pear crop forecast is up 24 percent from a year ago. Pacific Coast production of Bartlett pears is expected to be 27 percent larger than in 1996, while output of other varieties, intended mainly for fresh use, will be up 24 percent. While Bartlett pear production will likely rise only 5 percent in California, production is expected to increase sharply in Washington (up 71 percent) and Oregon (up 67 percent). Increased supplies of pears, as well as apples, indicate lower pear prices during the 1997/98 marketing season.

U.S. peach production is forecast up 28 percent from 1996 as Georgia, South Carolina, and much of the Southeast region recover from last year's crop failure and California produces a sizable crop. The 1997 U.S. freestone peach crop, mostly for fresh use, is forecast up 58 percent from a year ago, while California's clingstone output, mostly for canning, is expected up fractionally. Overall, the larger peach crop and increased competition from ample supplies of other summer fruit will likely generate lower peach prices than a year ago.

The 1997 U.S. apricot crop is forecast well above levels of the last 2 years, and lower prices are expected. Favorable weather led to larger crops in California and Washington, but a frost in Utah precipitated a crop failure.

Improved growing conditions in most sweet cherry growing areas, especially in the Pacific Northwest, helped the overall performance of the 1997 U.S. sweet cherry crop. Production is forecast up 24 percent from a year earlier, with large increases in Washington, California, Oregon, and Michigan. Grower prices for fresh sweet cherries will be pressured by this year's large crop, but the crop's good quality and continued strong export demand will help limit price declines.

The 1997 U.S. tart cherry crop is forecast to be the smallest since 1991 and down 10 percent from a year ago. Due to a cold spring, production in Michigan—which accounts for over 70 percent of the Nation's production—is expected to be 8 percent smaller than last year. Except for Wisconsin and Oregon, other tart cherry growing States are also expected to harvest smaller crops.

Commercial strawberry production in the six major producing states—California, Florida, Oregon, Washington, Michigan, and New Jersey—is forecast down 4 percent from a year ago in 1997. Favorable winter and spring weather increased yields in California, but a decline in harvested area reduced production 7 percent. Florida's 1997 winter strawberry crop is forecast up 17 percent from last year due to higher yields and increased acreage. Expected higher fresh strawberry prices and lower prices for other fresh fruit could lead to reduced domestic consumption in 1997.

Preliminary fruit counts from the California Kiwifruit Commission indicate that California's 1997 kiwifruit production will be up from last year and of good quality. Fresh kiwifruit grower prices will likely decline. Lower prices and good fruit quality will likely boost domestic consumption and export demand.

U.S. banana and mango consumption reached record highs in 1996. Bananas remain the most popular fresh-market fruit consumed in the United States, followed by apples and oranges. U.S. mango consumption has grown rapidly in recent years. In 1995, fresh mango consumption exceeded that of numerous other fresh fruits, including apricots, cherries, cranberries, kiwifruit, papayas, plums, and prunes. Indications are this trend continued in 1996. Last year, fresh papaya imports increased 72 percent from 1995, boosting domestic consumption. Meanwhile, U.S. consumption of fresh pineapple fell slightly, as it has for the previous 2 years.

The U.S. orange crop is forecast at 12.9 million tons in 1996/97, surpassing the previous record in 1979/80 by 9 percent. Florida's production will account for most of the increase, but larger crops are also expected in California and Texas. The large supply of oranges lowered fresh-market prices during first-half 1997 and heavy competition from large stone fruit and grape crops this summer may weaken summer demand for California Valencias. However, the good quality of the Valencia crop should help maintain prices.

The forecast record orange crop in Florida has led to an expected large supply of orange juice for 1996/97. In addition, juice yield estimates were 4 percent higher than a year ago, at 1.58 gallons per box. Increased orange production and higher juice yields are expected to boost frozen concentrated orange juice (FCOJ) production 13 percent from 1995/96. Although futures and grower prices have been lower throughout the 1996/97 marketing year, retail prices for FCOJ have averaged about 6 percent higher than a year earlier.

The utilized grapefruit crop in 1996/97 is expected to be 8 percent above 1995/96. Production is up in Florida, California, and Texas, but down in Arizona. The large supply, along with weak demand and large supplies of fresh oranges and imported fruit, pushed grapefruit prices down. Increased processing supplies and higher juice yields boosted the grapefruit juice supply over the previous year. However, juice movement has been slower than the previous 2 years, lifting grapefruit stocks 17 percent above last year. Higher juice stocks and decreased demand for grapefruit byproducts have put downward pressure on grower prices in Florida for processing grapefruit. With another large crop expected in 1997/98 and the present slow movement of stocks, grower prices for processing grapefruit can be expected to be low again in 1997/98.

Tree nut production will likely reach record highs in 1997, with increases expected for all tree nuts. The larger crops point to lower tree nut prices in the 1997/98 marketing year. However, low beginning stocks for most tree nuts will moderate supplies and keep prices strong this season.

Fruit Price Outlook

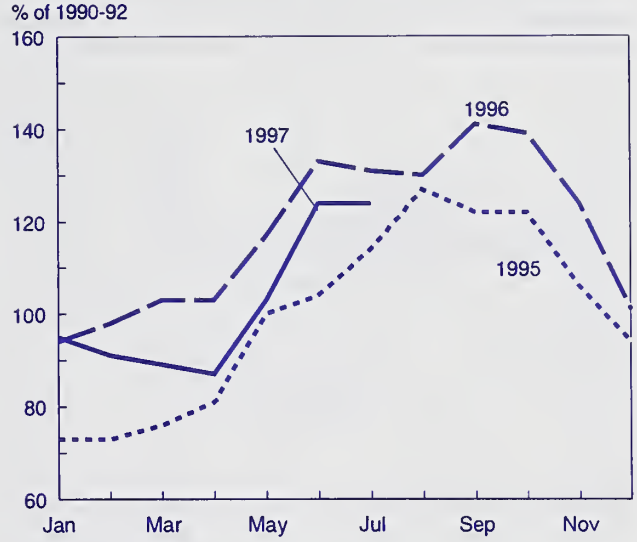
Large Crops Lower Grower Prices

Grower prices for many noncitrus and citrus fruits are likely to stay lower than a year ago for the remainder of 1997 and into 1998. Several key Western States are harvesting larger crops of grapes and pears this fall, U.S. apple production is expected to increase, and conditions are favorable for another large orange and grapefruit crop for the 1997/98 season. Washington's slightly smaller apple crop, however, will help moderate grower prices for fresh-market apples, keeping them unchanged to slightly higher than a year ago.

During the spring and summer, increased production of California stone fruit (peaches, plums, nectarines, apricots) lowered grower prices. Peach and nectarine supplies from the Southeast region, mainly South Carolina and Georgia, also recovered from last year's freeze-damaged levels and provided more competition with supplies from California. As the 1996/97 apple season came to a close, apple prices were also lower. Apple prices were pressured by increased fresh-market apple production in the fall of 1996, resulting from Washington's larger crop and the availability of mostly smaller-sized apples. Orange and grapefruit prices were also lower during the first 7 months of 1997, attributed mainly to a record large Florida orange crop and a large U.S. grapefruit crop in 1996. As a result, the grower price index for fruit and nuts averaged 8 percent lower than a year ago during the first 7 months of 1997 (table 1).

Offsetting some of the lower prices of many fruits during the same period were higher grape and pear prices, due mostly to reduced production in the fall of 1996. Fresh strawberry grower prices were also higher, reflecting strong demand and the projected decline in California's 1997 output. Tree nut prices were generally higher during 1996/97, except for pecans, almonds, and hazelnuts. Almonds are the only tree nut included in the calculation of the grower price index for fruit and nuts. Projected increased almond supplies in 1997/98 will likely lead to a decline in almond prices for this season, but continued strong export demand will help maintain strong prices.

Figure 1
Prices Received by Growers for Fruit and Nuts



Relatively Cheaper Fruits for U.S. Consumers In Second-Half 1997

The Consumer Price Index (CPI) for fresh fruits averaged 3 percent above a year ago during the first 6 months of 1997 (table 2). First-half 1997 retail prices averaged higher for Anjou pears, Thompson Seedless grapes, strawberries, grapefruit, and lemons. Lower prices for fresh navel oranges and Valencia oranges were partly offsetting while retail prices of Red Delicious apples and bananas were about unchanged. The CPI for fresh fruits fluctuated through first-half 1997 and fell below a year earlier in June.

Expected heavy competition from increased fruit supplies this summer and fall could continue to weaken the CPI for fresh fruits, keeping it below a year ago for the rest of 1997 and into early 1998. California's 1996/97 Valencia output, responsible for most of the fresh orange marketings during the summer, will also be up along with grapes and stone fruit. The good quality of California Valencia oranges this summer, however, will likely help maintain fresh-market orange prices. This year's retail prices for fresh Valen-

Table 1--Index of prices received by growers for fruit and nuts, 1993-97

Month	1993	1994	1995	1996	1997
			1990-92=100		
January	72	79	73	94	95
February	72	80	73	98	91
March	69	85	76	103	89
April	73	87	81	103	87
May	81	92	100	117	103
June	97	96	104	133	124
July	101	100	114	131	124
August	113	104	127	130	
September	121	102	122	141	
October	119	95	122	139	
November	106	85	106	124	
December	86	76	94	101	
Annual	93	90	99	118	

Source: National Agricultural Statistics Service,USDA.

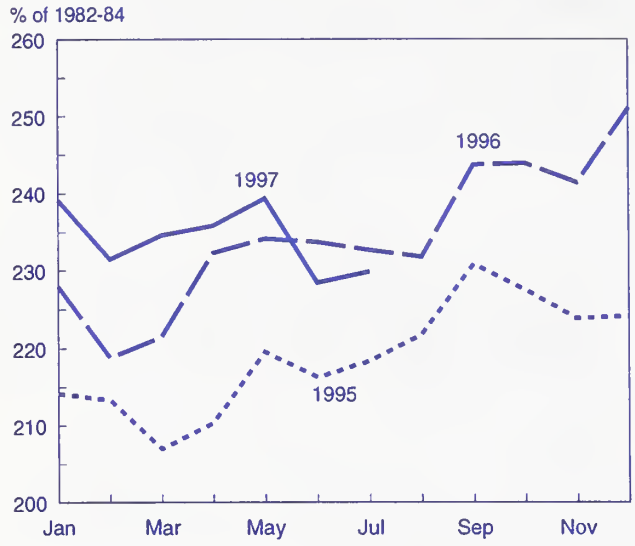
Table 2--U.S.consumer price indexes for fruit, 1995-97

Month	Fresh fruit			Processed fruit		
	1995	1996	1997	1995	1996	1997
			--1982-84=100--			
January	214.2	228.0	239.1	134.4	140.7	148.6
February	213.3	218.8	231.5	135.3	141.9	149.8
March	207.0	221.5	234.6	136.5	141.3	148.9
April	210.3	232.3	235.8	136.8	142.8	148.4
May	219.6	234.2	239.4	136.7	145.7	149.3
June	216.3	233.7	228.5	137.2	145.3	149.1
July	218.4	232.7	229.9	138.0	147.6	149.7
August	221.8	231.8		139.2	147.2	
September	230.9	243.7		138.1	147.6	
October	227.5	243.9		138.4	146.9	
November	223.9	241.4		137.6	147.5	
December	224.2	251.1		138.1	147.3	

Source: Bureau of Labor Statistics, Department of Labor.

Figure 2

Fresh Fruit: Consumer Price Index



cia oranges averaged 60.7 cents a pound in July, compared with 60.4 cents in July 1996. July retail prices for Thompson Seedless grapes and peaches were 10 percent and 22 percent lower than a year ago, respectively. Washington's Red Delicious apples are expected to be short of last year's output, helping to support fresh apple retail prices in 1997/98.

The Consumer Price Index for processed fruit averaged 4 percent higher from January to June 1997, due mostly to higher prices for orange juice. The CPI for frozen fruit and juice averaged 6 percent higher than a year ago in 1996. For the first 6 months of 1997, the CPI for frozen fruit and juice advanced 4 percent from the same period in 1996. Despite the forecast of increased orange juice supplies in 1996/97, retail prices for FCOJ averaged 6 percent higher during the first half of 1997. The CPI for canned and dried fruit averaged 4 percent higher.

Noncitrus Fruit Outlook

U.S. Apple Crop Larger in 1997, but Washington's Output Smaller

USDA's August forecast of the 1997 U.S. apple crop was 10.6 billion pounds, up 3 percent from last year. A smaller Washington crop will be offset by increases in most apple-producing States, including New York and Michigan. Production in the Western States is forecast down 3 percent from a year ago, while comparable production in the Eastern and Central States will be up 5 percent and 37 percent, respectively (table 3).

Production in Washington is forecast at 5.4 billion pounds, down 2 percent from a year ago. This decline likely consists mostly of Red Delicious apples due to a light bloom. The California apple crop is forecast at 900 million pounds, unchanged from last year. Relatively cooler weather in California for most of the season was conducive for fruits to size well and many varieties were maturing about 2 weeks ahead of schedule. Favorable weather in Oregon increased crop potential in that State. The generally mild winter and spring this year in the central region and in other Eastern States resulted in less freeze injury to the 1997 fall apple crop, and the overall crop appears to be in good condition. Pollination was generally adequate and blooms were in fair to good condition. The crop in Michigan produced a good fruit set but dry weather was affecting the sizes of fruits produced. Michigan's production is forecast up 45 percent from a year ago, while New York and Pennsylvania's output will also be up 5 percent and 21 percent, respectively. A spring freeze and poor pollination, however, affected crop potential in North Carolina, Virginia, and Kentucky, leading to production declines in these States.

Apple supplies in storage are above last year, attributed mainly to Washington's 13-percent larger crop last fall. According to the U.S. Apple Association (formerly known as International Apple Institute), U.S. apple stocks on July 1,

Figure 3
U.S. Apple Utilization

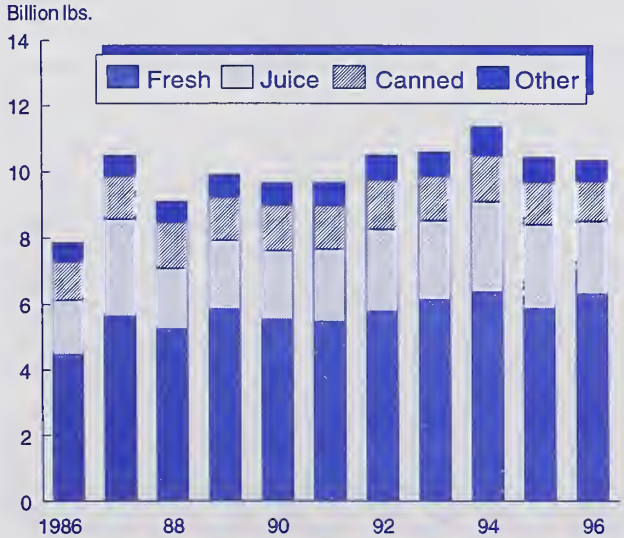
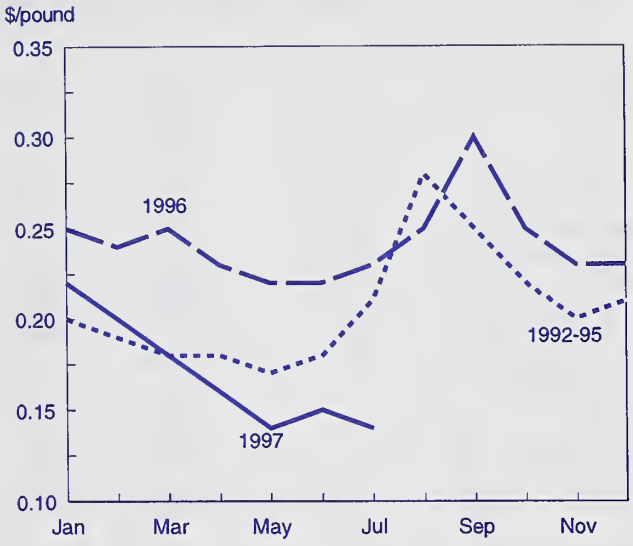


Figure 4
U.S. Grower Prices for Fresh Apples



1997, were up 35 percent from a year ago and 46 percent above the 5-year average (1992-96). Washington-grown apples make up 92 percent of the total stocks, and are mostly for fresh use. Apple stocks consist mostly of Red Delicious (70 percent), Golden Delicious (16 percent), and Granny Smith (5 percent).

Despite reduced production in 1996, fresh use increased 8 percent from a year earlier and mostly consisted of smaller-sized apples. The 1996 season-average grower price for fresh-market apples declined 13 percent, dropping the total 1996 crop value 5 percent to $1.67 billion. While grower prices for processing apples rose in 1996, the quantity of processing apples declined 12 percent, also contributing to the decline in the total crop value. The 1996/97 season-average all-apple grower price (August-July) was 16.2 cents a pound, down from 17 cents the previous year, but up 8 percent from the 1990-1995 average. Fresh-market grower prices averaged 20.9 cents per pound in 1996, down from 24 cents in 1995. Grower prices for processing apples averaged 8.8 cents per pound in 1996, compared with 8.0 cents a year earlier. Higher stocks from Washington's large crop last fall, strong competition with increased summer fruit supplies, and a larger U.S. apple crop in the fall of 1997 will pressure apple prices during the second half of 1997, likely keeping them below a year ago. However, a slightly smaller Washington crop this year will likely help to moderate fresh-market apple prices in 1997/98.

U.S. fresh apple exports from August 1996 to May 1997 totaled 1.29 billion pounds, up 21 percent from a year earlier. Exports were boosted by the large 1996 western crop and strong demand from leading export markets. Canada, Mexico, and Asian countries, particularly Taiwan, Indonesia, and Hong Kong, will continue to be top markets for U.S. apples. These countries made up 13 percent, 12 percent, 20 percent, 8 percent, and 7 percent, respectively, of the cumulative export volume thus far for the 1996/97 season. The European Union and Brazil will continue to be important markets, representing 5 percent and 3 percent of the total

Table 3–Apples: Total production and season-average prices received by growers, 1994-96, and indicated 1997 production 1/

State and area	Production				Price		
	1994	1995	1996	1997	1994	1995	1996
	-- Million pounds --				-- Cents per pound --		
EASTERN STATES:							
Connecticut	25	21	20	20	28.3	27.6	32.4
Delaware	20	15	15	2/	16.8	12.5	18.5
Georgia	26	30	22	26	13.9	16.4	17.0
Maine	54	65	67	64	17.4	17.9	20.2
Maryland	35	35	29	26	17.3	13.1	15.6
Massachusetts	63	65	58	58	22.6	20.8	26.2
New Hampshire	41	44	38	41	21.7	20.3	22.9
New Jersey	70	75	60	65	15.7	15.9	15.1
New York	1,100	1,110	1,030	1,080	11.8	12.1	13.5
North Carolina	250	270	200	170	8.8	8.4	12.0
Pennsylvania	400	500	391	475	10.4	9.5	12.9
Rhode Island	5	5	6	6	31.0	30.1	25.9
South Carolina	60	60	35	55	13.0	12.6	14.2
Vermont	42	45	38	35	16.5	18.1	18.7
Virginia	305	400	275	250	9.0	9.9	11.6
West Virginia	150	165	105	115	9.5	11.0	11.2
Total	2,645	2,904	2,388	2,486			
CENTRAL STATES:							
Arkansas	8	10	7	10	16.4	14.3	18.0
Illinois	47	80	53	89	20.9	21.0	29.0
Indiana	50	75	48	56	20.0	19.7	26.9
Iowa	12	10	10	12	24.4	30.3	31.2
Kansas	5	7	2	7	20.6	30.5	25.8
Kentucky	7	17	15	12	21.6	25.5	31.6
Michigan	1,020	1,220	725	1,050	8.6	9.9	12.0
Minnesota	23	22	21	22	33.2	40.3	46.0
Missouri	33	38	32	43	19.8	16.0	23.3
Ohio	90	120	90	75	18.1	20.0	26.6
Tennessee	10	16	11	11	19.5	21.5	24.1
Wisconsin	80	58	46	63	23.0	24.1	31.5
Total	1,385	1,672	1,060	1,450			
WESTERN STATES:							
Arizona	64	11	100	45	7.8	7.1	12.4
California	1,050	850	900	900	13.3	18.3	16.5
Colorado	85	55	35	50	15.7	14.5	16.2
Idaho	165	80	180	130	10.1	17.4	14.4
New Mexico	8	3	5	2/	21.9	29.8	30.6
Oregon	200	140	139	155	10.7	11.6	12.6
Utah	48	20	48	33	12.1	18.8	14.1
Washington	5,850	4,850	5,500	5,400	13.8	21.5	17.2
Total	7,470	6,009	6,907	6,713			
United States	11,501	10,585	10,355	10,649	12.9	17.0	16.2

1/ Commercial production from orchards of at least 100 bearing-age trees.
2/ Forecast discontinued.

Source: National Agricultural Statistics Service, USDA.

export volume. U.S. fresh apple exports were up in all these markets, except to Hong Kong (down by a fraction). Brazil has been a large-growth market in recent years due mainly to the elimination of import barriers and an improved Brazilian economy. U.S. fresh apple shipments to Brazil have risen from 847,000 pounds in 1991/92 to 29.1 million pounds in 1995/96. Reduced production in Washington this fall and an unchanged crop in California will likely limit exports of U.S. fresh apples in 1997/98. Washington and California provide most of the fresh apple supplies for export.

U.S. Grape Production Up in 1997

USDA forecasts the 1997 U.S. grape crop to be up 20 percent from last year, to 13.3 billion pounds (table 4). If realized, this will be the largest grape crop in history, breaking the 1982 record of 13.1 billion pounds. California produces about 90 percent of U.S. grape production and in 1997, is forecast to harvest 12 billion pounds, up 20 percent from 1996 and 15 percent larger than 2 years ago. Favorable weather in the spring of 1996 induced heavy bunch formation for the 1997 crop. In addition, the mild winter and relatively dry, mild spring in the State this year were ideal for pollination and conducive to rapid crop development. The

Table 4--Grapes: Total production and season-average prices received by growers in principal States, 1994-96, and indicated 1997 production 1/

State	Production				Price		
	1994	1995	1996	1997	1994	1995	1996
	-- Million pounds --				-- Cents per pound --		
Arizona	52	52	50	50	47.0	44.9	40.2
Arkansas	12	16	18	16	23.8	31.7	31.5
Georgia	6	6	7	8	46.0	55.5	53.5
Michigan	130	140	130	120	11.5	11.9	11.4
Missouri	5	5	4	4	24.4	24.0	24.0
New York	380	330	378	310	10.7	11.1	11.9
North Carolina	3	3	2	2	36.5	39.1	37.9
Ohio	14	18	16	18	12.0	11.4	12.2
Oregon	22	28	30	36	42.3	47.5	51.0
Pennsylvania	160	126	166	130	9.1	8.6	10.5
South Carolina	1	1	1	1	62.0	59.5	45.6
Washington	450	652	288	598	12.8	11.3	20.1
Total 1/	1,235	1,377	1,090	1,293			
California:							
Wine	4,530	4,550	4,450	5,400	18.9	21.2	26.8
Table	1,204	1,414	1,184	1,400	25.8	26.2	32.5
Raisin 2/	4,778	4,504	4,372	5,200	11.5	11.7	13.3
All	10,512	10,468	10,006	12,000	16.3	17.8	21.6
United States	11,747	11,845	11,096	13,289	16.1	17.3	21.2

1/ Some figures may not add due to rounding. 2/ Fresh weight of raisin-type grapes.

Source: National Agricultural Statistics Service, USDA.

crop is maturing ahead of schedule and the grapes appear above average in quality. Heavy rains in early January 1997 caused only minor damage to some grape growing areas in Napa Valley and San Joaquin Valley, while a frost in early April did not cause any significant damage.

California is expected to harvest 45 percent of its entire 1997 grape crop to wine grape varieties, up 21 percent from a year ago and the largest on record. Aside from good weather, recent plantings of wine grape varieties are now reaching bearing age and are also behind the rapid growth. Bearing acreage for wine grape varieties totaled 311,000 acres in 1996, up 3 percent from a year earlier and up about 6 percent from the 1990-91 average. Bearing acreage increased 2 percent from 1995 for white wine-type varieties and 5 percent for red wine-type varieties. Of the more dominantly planted wine-type grape varieties, the largest bearing acreage increases were for Chardonnay and Pinot Gris for white varieties and Merlot, Barbera, and Zinfandel for the red varieties.

Harvesting of raisin-type and table-type varieties was winding down by July 1 in California's Coachella Valley and was underway in the southern San Joaquin Valley by late June. Raisin varieties will likely account for 43 percent of all California grapes in 1997, up 19 percent from 1996 and 15 percent above 1995. No acreage was enrolled in the Raisin Industry Diversion program again this year, perhaps due to strong demand for crushing in 1995 and 1996. During 1996, the bearing acreage for raisin grapes in the State was up only fractionally from a year earlier, at 269,550 acres, with the Thompson Seedless variety predominating. Table grape variety output is forecast at 1.4 billion pounds, 12 percent of California's grape crop and 18 percent above last year. Flame Seedless, Red Globe, Ruby Seedless, Perlette, and Emperor are among the State's more popular table varieties, accounting for about 60 percent of the total table-type bearing acreage in 1996. Bearing acreage for table grape varieties declined 3 percent to 74,500 acres last year, with smaller acreage for each of the five popular varieties with the exception of Ruby Seedless.

USDA forecast grape production in 12 other States to be 1.3 billion pounds in 1997, up 19 percent from last year. Conditions improved in Washington, where the crop is expected to be more than double last year's freeze-damaged level. The increase will offset declines in New York, Michigan, Pennsylvania, and Arkansas. Cool temperatures early in the summer season delayed crop progress in New York and dry conditions also affected production. Unfavorable spring weather and lack of rainfall in the summer hampered production in Michigan and Pennsylvania. Production in these two States will likely be down 8 percent and 22 percent, respectively.

The processing sector captures about 86 percent of all utilized grapes produced in the United States. Wine is the largest category, making up 64 percent of all domestic grapes processed in 1996. This is followed by dried grapes with 28 percent, juice with 8 percent (which also happens to include minute quantities for other processed uses such as jam, jellies, etc.), and canned grapes with less than 1 percent. Fresh use, although comprising a much smaller share of total utilized production, remains a vital part of the U.S. grape industry. For grapes sold in the fresh market, maintaining a consistent high quality product is a challenge. The higher production costs and higher product value of fresh-market grapes reflect production practices that are more intensive than for grapes grown for processing. In 1996, grape growers received 13.4 cents more per pound for fresh-market grapes than for grapes sold to wineries and 24.7 cents per pound more than for grapes sold to raisin proces-

Figure 5
U.S. Grape Utilization

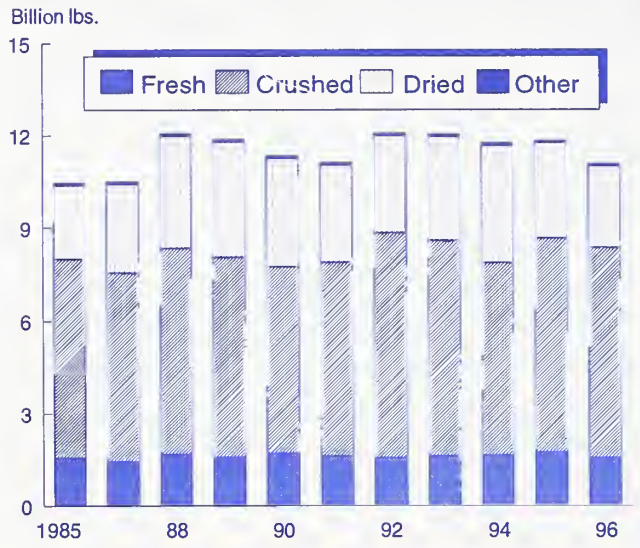
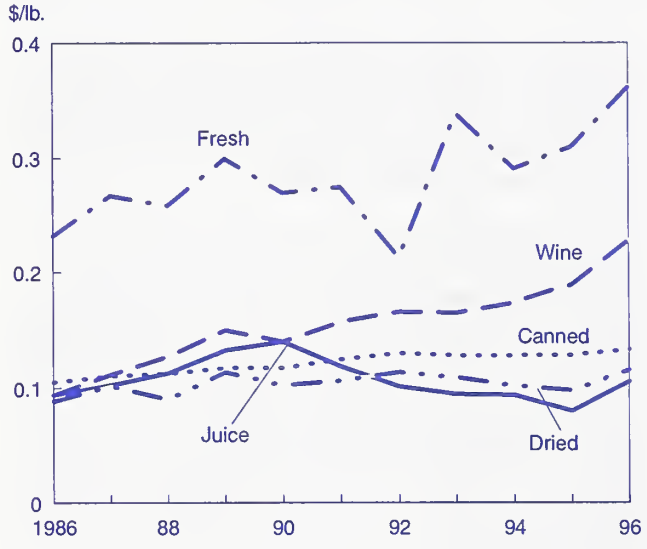


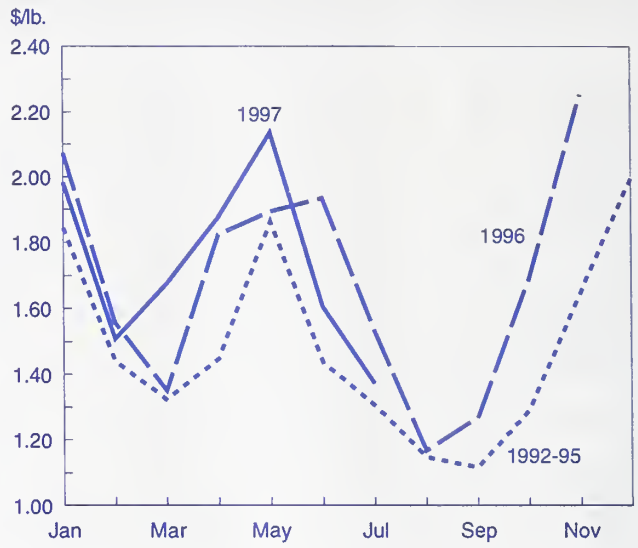
Figure 6
U.S. Grape Grower Prices, Season-Average by Use



sors. In the same year, 63 percent of California's fresh-market grapes were table varieties, 31 percent were raisin varieties, and the remainder were wine varieties.

Fresh use and processing use of the 1996 U.S. grape crop declined 10 percent and 6 percent, respectively, from a year earlier, reflecting below-average production compared with 1990-95. Lower yields resulting from unfavorable weather, primarily in California and Washington, accounted for most of the decline. Fresh use amounted to 1.5 billion pounds and processing use totaled 9.5 billion pounds. Reduced production caused 1996 grower prices to rise sharply to the highest levels on record for fresh-market grapes and all processing use grape categories. Grower prices for fresh-market grapes averaged 36.2 cents a pound ($725 per ton) in 1996, up 17 percent from a year earlier, while grower prices for processing use grapes averaged 18.7 cents a pound ($374 per ton), up 25 percent. The expected bounti-

Figure 7
Thompson Seedless Grapes: Consumer Price



ful harvest in 1997 will likely put some downward pressure on grower prices, but the good quality of the crop and continued strong demand from the domestic and international markets will likely prevent a steep decline in prices.

The United States produces about 10 percent of the world's grape output, the third largest after Italy and France. Although most U.S. grapes are used domestically, the United States remains a net importer of grapes for all uses except raisins. However, the export share of domestic grape supplies has risen, from an average of 9 percent in the 1970's to 12 percent in the 1980's and 17 percent in the 1990's. U.S. grape exports in 1997/98 will likely receive a boost from this year's large new crop of relatively good quality.

The volume of fresh-market grapes imported during the 1996/97 marketing season (May 1996-April 1997) was 6 percent lower than the previous season (table 5). Although lower, imports still constitute about one-third of U.S. fresh-market grape supplies. Over three-fourths of U.S. fresh grape imports come from Chile, and enter the country between January and May. Another 20 percent arrive from Mexico around May through early July, and compete to some extent with California's grape season, which typically begins in May and lasts through the following January. This shipment schedule could explain grower and retail price movements within a season. Fresh grape prices generally move down after May, bottom out in August when the largest supplies from California and Mexico become available, and rise to a peak in November when supplies diminish. Chilean shipments totaled 590.1 million pounds during 1996/97, down 2 percent from a year earlier. At the same time Mexican shipments totaled 132.2 million pounds, down 26 percent. Small quantities of fresh grapes were also shipped to the United States from Italy, Peru, and Brazil in 1996/97.

U.S. fresh grape exports in 1996/97 (May 1996-April 1997) totaled 457.1 million pounds, down 9 percent from the previous season. The three major markets were Canada, Hong

Table 5--U.S. imports of fresh grapes, by country, (May-April) 1992/93-1996/97

Source	1992/93	1993/94	19994/95	1995/96	1996/97
	Million pounds				
Chile	628.0	586.2	619.0	603.4	590.1
Mexico	81.7	91.1	90.5	177.6	132.2
Canada	3.4	0.6	1.6	2.8	6.5
Italy	0.2	0.7	0.4	0.3	0.5
Other	0.8	2.1	7.6	8.5	17.3
World	714.1	680.7	719.0	792.6	746.5

Source: Bureau of the Census, U.S. Department of Commerce.

Kong, and Mexico. Canada remained the major destination, receiving 41 percent of U.S. fresh grape exports in 1996/97, but the growth was in shipments to Hong Kong (up 21 percent from a year ago) and other Asian countries such as South Korea (up 295 percent), Taiwan (up 25 percent), and the Philippines (up 22 percent). Fresh grape shipments to Canada and Mexico declined 17 percent and 28 percent, respectively.

Phytosanitary issues are preventing some South American countries from importing large amounts of U.S. fresh grapes, but in the last year, Colombia, Argentina, and Chile have opened their markets. The continuing growth of South American economies and the counter seasonality of U.S. and South American grape production could create an increasing demand for U.S. grapes. China also shows potential as an important market. After a successful final inspection tour of San Joaquin Valley vineyards by Chinese quarantine officials in July, the Chinese government gave its final authorization on August 5, 1997, to allow shipments of California fresh table grapes to China. Both the U.S. and Chinese governments signed an agreement back in May, opening China's markets to California fresh table grapes for the first time beginning with this season's crop. According to the California Table Grape Commission, the week-long tour of the vineyards was a success because table grape growers and county agricultural commissioners met all the requirements set forth in the agreement. The Chinese quarantine officials toured vineyards and cold storage facilities in Kern, Tulare, Fresno, Madera, and Kings County. The current agreement only covers the first four counties, but efforts are still underway to include Kings County. Under the protocol, California grapes will still face a stiff tariff of 55 percent with a 13-percent value-added tax. Despite the high tariff and the undeveloped nature of the Chinese market, the California Table Grape Commission is optimistic about the trade prospects and is ready to begin market development activities in China.

The United States is a net importer of grape juice. During 1996, U.S. grape juice imports totaled 4.95 billion pounds (fresh-weight equivalent) while exports totaled 1.75 billion pounds. Around 75 percent of the imports last year came from Argentina, followed by nearly 12 percent from Chile and 11 percent combined from Mexico and Brazil. Grape juice imports rose 153 percent from a year earlier in 1996. This was mainly due to reduced production in Washington and Michigan, major juice-producing States, and to the diversion of some juice grapes to supplement low grape supplies for wine production. Expected large crops in both States in 1997 will likely cause a reduction in grape juice imports this year. Cumulative imports from January through May 1997 were down 19 percent from the same time a year ago.

Despite a decline in domestic grape juice supplies, U.S. grape juice exports rose 13 percent from a year earlier in 1996. Exports rose mainly to the Republic of Korea (up 189 percent), United Kingdom (up 145 percent), the Philippines (up 34 percent), Japan (up 15 percent), and Taiwan (up 8 percent). Exports to Canada, still the largest market, declined 6 percent while exports to Hong Kong fell 23 percent. Cumulative exports from January through May 1997 were up 30 percent from the same period a year ago.

The United States is one of the world's major raisin exporters, second only to Turkey. U.S. raisin exports rose 2 percent from a year earlier in 1996 to 272 million pounds, reflecting significant growth to Japan, Sweden, Taiwan, and Singapore, all leading foreign destinations for U.S. raisins. The United Kingdom has been the major market for U.S. raisins, followed closely by Japan. Exports to Japan, however, exceeded those to the United Kingdom where shipments declined by a fraction. Each of the two countries accounted for about 23 percent of all U.S. raisin exports last year, while Canada, the Federal Republic of Germany, Denmark, and Sweden combined, made up the next 23 percent. U.S. raisin imports generally average only about 3 percent of domestic supplies, and in 1996 totaled 25.2 million pounds, down 4 percent from the prior year. Imports come mainly from Mexico and Chile.

The United States remains a net importer of wine, with imports amounting to 3.57 million hectoliters during 1996 and exports at 1.63 million hectoliters. U.S. wine imports and exports both rose from a year ago, up 28 percent and 23 percent, respectively. Wine shipments from Italy, France, Chile, and Spain made up 82 percent of all U.S. wine imports last year, up 13 percent, 31 percent, 117 percent, and 4 percent from a year earlier, respectively. More than half of total U.S. wine exports are shipped to the United Kingdom, Canada, and Japan. U.S. shipments to these three major markets in 1996 rose 15 percent, 21 percent, and 5 percent, respectively, from the prior year. Continued strong demand for domestic wines and anticipated record large wine grape supplies in California in 1997 will likely help further the growth in U.S. wine exports in the next few years. Cumulative exports of U.S. wine from January through May 1997 were up 29 percent from a year earlier.

Larger Pear Crop in 1997

The 1997 U.S. pear crop is forecast at 2.0 billion pounds, up 24 percent from the prior year (table 6). Pacific Coast production of Bartlett pears, which are mostly canned, is expected to be 27 percent larger than in 1996, while output of other varieties intended mainly for fresh use will be up 24 percent. Over the past 3 years, Pacific Coast output of Bartlett pears averaged 54 percent of U.S. pear production. While Bartlett pear production will likely rise only 5 percent in California where more than half of the crop is

Table 6--Pears: Total production and season-average price received by growers, 1994-96, and indicated 1997 production

State	Production 1/				Price		
	1994	1995	1996	1997	1994	1995	1996
	-- Million pounds --				-- Cents per pound --		
Pacific Coast:							
California:							
Bartlett	666	494	574	600	9.2	10.6	13.4
Other	60	40	60	60	14.1	26.9	25.0
Total	726	534	634	660	9.6	11.9	14.5
Oregon:							
Bartlett	166	140	90	150	10.7	12.6	18.1
Other	350	320	260	360	11.0	14.9	24.5
Total	516	460	350	510	10.9	14.2	22.9
Washington:							
Bartlett	348	360	210	360	11.3	11.5	18.8
Other	436	480	390	460	13.3	16.0	21.9
Total	784	840	600	820	12.4	14.1	20.8
3 States:							
Bartlett	1,180	994	874	1,110	10.0	11.2	15.2
Other	846	840	710	880	12.4	16.1	23.1
Total	2,026	1,834	1,584	1,990			
Colorado	8	6	2	8	13.4	17.9	21.8
Connecticut	3	2	2	2	29.0	35.0	36.3
Michigan	9	11	12	7	14.0	14.0	13.0
New York	32	29	30	23	15.2	18.6	19.2
Pennsylvania	12	13	8	8	19.3	18.2	25.3
Utah	2	2	3	2	18.0	23.0	24.2
Total	66	63	57	50			
United States							
Bartlett	1,180	994	874	1,110	10.0	11.2	15.2
Other	912	903	767	930	12.4	16.1	23.1
Total	2,092	1,897	1,641	2,040	11.2	13.6	18.8

1/ Includes unharvested production and production not sold.

Source: National Agricultural Statistics Service, USDA.

grown, production is expected to increase sharply in Washington (up 71 percent) and Oregon (up 67 percent). If these production increases are realized, Washington will harvest its second largest Bartlett pear crop on record and Oregon its largest.

Pear orchards in the Pacific Coast faced good growing weather in the spring of 1997, receiving relatively more warm and dry periods than a year ago that were beneficial for pollination and promoted rapid crop growth. In California, the Bartlett pear crop is reported to have good quality and good fruit size. Favorable spring and early summer weather promoted good quality and early maturity of the State's Bartlett crop, and as of August 1, about 60 percent of the Bartletts have been harvested. The crops in Washington and Oregon have improved significantly from last year's low production, which resulted mainly from poor pollination in the spring of 1996. Other varieties that develop later than Bartlett in the Pacific Northwest also benefited from the generally good growing conditions this spring. In the other States, particularly in New York, Pennsylvania, and Michigan, production of all pears will likely be down due to poor pollination.

Increased supplies of pears, as well as apples, from this year's crop, indicate lower pear prices during the 1997/98 marketing year. However, because of the small 1996 crop, carryover stocks of other-than-Bartlett fresh pears in the beginning of the 1997 season (or as of June 30, 1997) are only up 1 percent from last year, according to USDA's *Cold Storage* report. Bartlett fresh pears in storage were depleted by May 31, 1997. The small carryover stocks will aid in moderating this season's supply situation and will help support prices somewhat. The season-average grower price for all pears in 1996 was record high, up 38 percent from the prior year, as utilized production declined 13 percent to 1.64 billion pounds. Fresh use, including exports, fell 16 percent and amounted to 56 percent of the utilized pear crop in 1996. Consequently, last season's grower prices for all fresh-market pears averaged 24.7 cents per pound ($494 per ton), 44 percent above the prior year and also the highest on record. Grower prices for Bartlett fresh pears averaged 39 percent higher, while grower prices for non-Bartlett fresh-market pears averaged 49 percent higher.

Processing accounted for 44 percent of the 1996 utilized pear output and the quantity processed fell 11 percent from

Figure 8
U.S. Grower Prices for Fresh Pears

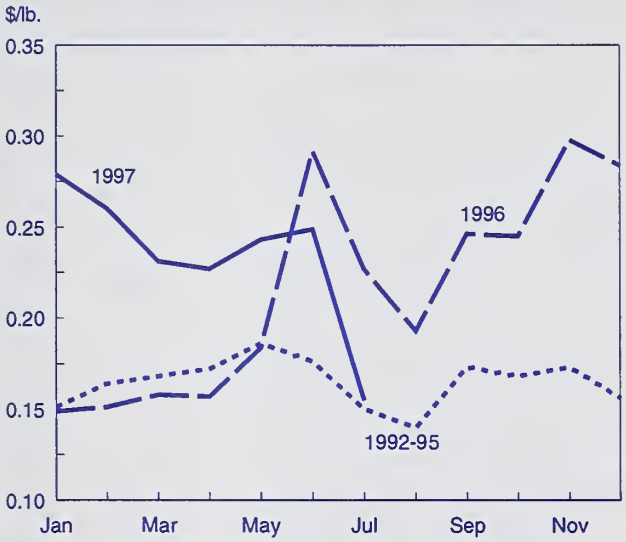
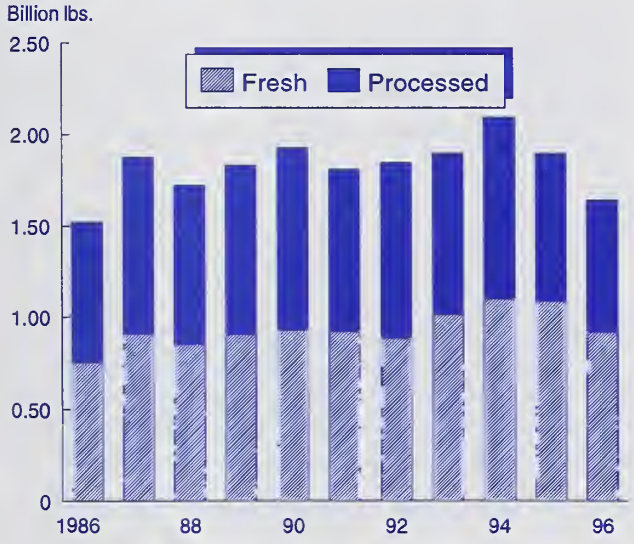


Figure 9
U.S. Pear Utilization



a year earlier. Bartlett pears represented 84 percent of all processed pears. Low processing supplies pushed grower prices for all processing pears up 26 percent from a year earlier in 1996, and Bartlett processing pear prices were up 30 percent.

The expected increase in domestic production and likely lower domestic pear prices, not to mention the generally good quality of the crop, will likely stifle imports and help boost exports during 1997/98 (July-June). During the previous season, exports of U.S. fresh pears between July 1996 and May 1997 totaled 257.4 million pounds, down 17 percent from the same period a year earlier, reflecting low U.S. supplies and the sharply higher domestic prices. In the same time, Canada received 33 percent of the exports and was the leading destination for U.S. fresh pears, although the volume declined 11 percent. Other major markets were Mexico (26 percent), Brazil (15 percent), Taiwan (4 percent), and the European Union (6 percent). Exports to these other major markets declined except to Mexico where U.S. pear shipments rose 10 percent. Mexico was the largest market for U.S. fresh pears during 1993-95.

U.S. imports of fresh pears between July 1996 and May 1997 totaled 163.8 million pounds, up 37 percent from the same period a year earlier. Chile and Argentina were the major suppliers, accounting for 46 percent and 42 percent of the total imports. Pear shipments from these two countries rose 9 percent and 106 percent, respectively. Combined shipments from New Zealand, Republic of South Africa, and South Korea made up 11 percent of total U.S. fresh pear imports.

Large Supplies Dampen Peach Prices in 1997

U.S. peach production in 1997 is forecast up 28 percent from a year earlier as Georgia, South Carolina, and much of the Southeast recover from last year's crop failure and California produces a sizable crop (table 7). The U.S. freestone peach crop, mostly for fresh use, is forecast at 1.5 billion pounds, up 58 percent from a year ago, while California's clingstone output, mostly for canning, is expected up fractionally from last year's 1.1 billion pounds. Severe freezes hit the Southern States in February and March of 1996, virtually wiping out the crops in South Carolina and Georgia and resulting in a 10-percent reduction in the 1996 U.S. peach output. Next to California, these two States average about 15 percent of the U.S. peach output. Another freeze in April 1997 hit the same region, but damage was less severe. In Georgia, the freezing temperatures caused isolated crop damage but had no significant impact. Georgia's production is forecast relatively unchanged from 1995 (prior to the freeze-damaged levels in 1996) while South Carolina's crop is still 30 percent smaller.

Spurred by generally favorable conditions, California's 1997 peach crop is forecast up 8 percent from a year ago and is of generally good to excellent quality. Nectarine pro-

Figure 10
U.S. Peach Utilization

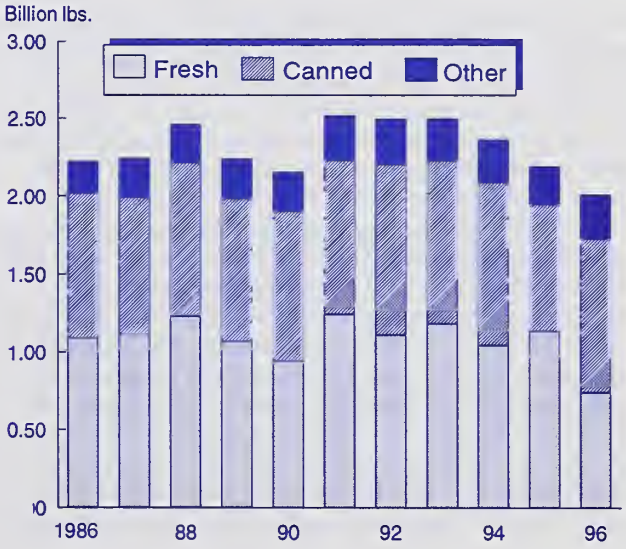


Table 7--Peaches: Total production and season-average prices received by growers, 1994-96, and indicated 1997 production

State	Production				Price		
	1994	1995	1996	1997	1994	1995	1996
	-- Million pounds --				-- Cents per pound --		
Alabama	17	22	0.5	26	23.5	28.5	50.6
Arkansas	8	20	1	18	24.5	17.7	15.5
California							
Clingstone	1,130	865	1,093	1,100	9.0	10.7	11.0
Freestone	634	502	633	760	10.7	18.6	21.3
Colorado	20	17	17	9	31.9	49.6	49.6
Connecticut	2	2	3	3	50.0	60.0	55.0
Delaware	3	2	2	2/	36.5	38.6	42.5
Georgia	175	160	10	160	18.4	20.3	33.8
Idaho	4	4	9	6	35.1	34.5	47.0
Illinois	5	13	2	13	32.0	33.9	64.0
Indiana	1/	5	2	3	1/	36.1	47.3
Kansas	0.5	1	0.4	0	26.0	41.0	45.0
Kentucky	1/	6	0.7	3	1/	32.2	62.3
Louisiana	4	5	0.2	5	44.0	54.6	78.0
Maryland	3	12	9	8	39.2	30.8	40.0
Massachusetts	1	1	2	2	50.0	70.0	55.0
Michigan	15	60	40	60	22.7	21.0	27.2
Missouri	5	9	3	10	32.0	31.5	46.0
New Jersey	75	70	78	75	32.9	38.5	43.7
New York	7	12	12	14	25.1	20.7	34.8
North Carolina	33	35	2	18	22.4	22.0	40.2
Ohio	1/	6	7	6	1/	42.1	46.2
Oklahoma	25	30	1/	6	29.5	37.0	1/
Oregon	16	9	11	13	29.8	29.7	41.1
Pennsylvania	1/	90	75	75	1/	27.4	33.1
South Carolina	250	215	3	150	18.8	18.0	59.1
Tennessee	2	10	0	5	40.4	35.4	67.5
Texas	20	24	6	20	39.0	36.0	74.0
Utah	7	6	7	7	23.0	25.0	24.0
Virginia	12	26	14	8	22.6	23.0	34.0
Washington	41	44	11	50	21.8	31.8	50.5
West Virginia	1/	18	16	14	1/	22.4	36.9
United States	2,514	2,302	2,070	2,644	13.3	18.5	18.9

1/ No significant commercial production due to frost damage.

2/ Forecast discontinued in 1997.

Source: National Agricultural Statistics Service, USDA.

duction in the State has also performed well and is expected to surpass last year's 486 million pounds. According to industry sources, early peach and nectarine varieties were affected by some frost damage and lack of chilling hours in the winter of 1997. Because production of early varieties was running about a week ahead of schedule, early-variety fruits from the second and third pickings were smaller. Other than the fact that some midseason varieties typically yield good size fruits, cooler weather in early June also slowed the harvest of other varieties, which consequently allowed more time to achieve larger fruit size. Last year, in spite of inadequate chilling hours, peach and nectarine orchards produced heavy bloom sets and production was up 26 percent and 38 percent, respectively, from a year earlier.

The 1997 peach crops in most Northeastern States were about average despite a freeze during the bloom period in April. However, a drought in early July in New Jersey hampered crop development and will likely lead to a 4-percent smaller crop in the State. Combined production in New Jersey, New York, and Pennsylvania this year is expected to be 2 percent larger than in 1996. Crops in most North Central States were also in good condition. Cool, wet weather during the spring has delayed the maturity of the Michigan crop, but overall production in the State is in excellent condition, up 50 percent from last year's freeze-damaged level and unchanged from 1995. Crop prospects in the Mountain States such as Colorado, Utah, and Idaho were hampered by frosts and a rainy, cold spring, delaying crop development and resulting in lower yields.

Overall, the larger U.S. peach crop in 1997 and increased competition from ample supplies of other summer fruits will likely lead to lower peach prices compared to a year ago. California's increased fresh-market peach output and the return of supplies from the Southeast region already

helped lower early season prices in 1997. Grower prices for fresh-market peaches in May-July 1997 averaged 24 percent or about 7 cents a pound lower than prices during the same period last year. With California shipments peaking in July and with increased marketings from the Northeast and North Central States in July and August, prices are also likely to move down seasonally. Grower prices for fresh-market peaches in July averaged 19.8 cents a pound, down from 30.4 cents in May. The California Canning Peach Association reported a three-tiered price scale negotiated with canners for the 1997 clingstone peach crop. The price scale ranged from a minimum of $214 per ton to a high of $224 per ton. The established price in 1996 was $200 per paid ton.

U.S. exports of fresh-market peaches and nectarines gained about 13 percent in 1996/97 (May-April) over 1995/96 exports, reaching 166.4 million pounds. Exports to Canada and Taiwan rose 4 percent and 65 percent, respectively, while exports to Mexico dropped 25 percent. Combined, these three countries made up 89 percent of the total export volume. Exports were up significantly to New Zealand, Switzerland, Russia, Malaysia, Singapore, and Japan. These countries, however, each accounted for less than 1 percent of the export volume.

U.S. imports of fresh-market peaches and nectarines rose 2 percent to 92.1 million pounds in 1996/97, with shipments from Chile making up 99 percent of the volume and shipments from Canada the remainder. Imports from both countries rose 1 percent and 96 percent, respectively from the previous season.

U.S. canned peach exports declined 25 percent in 1996/97, with significant reductions to key markets such as Canada, Japan, South Korea, and Taiwan. Part of the decline may be attributed to increased world supplies and strong price competition from European and South African suppliers. U.S. imports of canned peaches, on the other hand, increased 94 percent, with much larger shipments from Greece, Spain, and the Republic of South Africa, the major U.S. suppliers.

Large Apricot Crop Likely To Pressure Prices in 1997

After 2 years of below-average production, the 1997 U.S. apricot crop is forecast at 264.0 million pounds, well above output in 1995 and 1996 (table 8). The relatively small U.S. apricot crops in the past 2 years were attributed mainly to poor weather during pollination. If realized, this year's large production forecast will not surpass 1994's 306.4 million pounds, the largest crop in the last 20 years, but will be 15 percent above the 1990-94 average.

Prospects are highly favorable for apricot production in California and Washington, generally due to good weather. Adequate chilling hours in the winter of 1997 and a mild spring yielded a heavy fruit set in California, where over 90 percent of the Nation's apricots are produced. The new crop forecast for the State is set at 250.0 million pounds, up 64 percent from last year and more than double the 1995 output. Washington's crop is expected to be 14.0 million pounds, more than double its 1996 size and up 7 percent from 1995. Unfortunately, apricot growers in Utah are experiencing another bad year like 1995, when their crop was totally destroyed by frost.

Apricot prices in 1997 are expected to average below last year due to the large crop. Although production also increased last year, grower prices reached record highs due mainly to the relatively small crop and strong domestic demand, especially in the processing sector. Fresh use of the 1996 apricot crop declined 18 percent while processing use was up 51 percent. The season-average grower price for processing apricots increased from 0.14 cents a pound ($287 per ton) in 1995 to 0.16 cents a pound ($314 per ton) last year. Prices paid by processors for apricots to be frozen and dried each rose 1 percent in 1996 from a year earlier while prices paid by canneries were up 10 percent. The decline in fresh-market production and the strong demand from canneries supported grower prices for fresh-market apricots last year, with the season-average at 0.59 cents a pound ($1,180 per ton), up from 0.45 cents ($900 per ton) in 1995.

Plum Prices Likely To Fall in 1997

USDA forecasts California's 1997 dried prune production to be down 2 percent from last year (table 9). Despite the decline, the new crop will still be well above the State's 1990-95 average output, due to favorable weather during the pollination period. California's plum production will be the largest on record. California begins to ship plums around May and continues shipping through October or November, with the most shipments occurring in June and July. Cumulative shipments from California from May through mid-July 1997 were running 35 percent above the same period last year. Prune and plum production in Idaho, Michigan, Oregon, and Washington is forecast to be unchanged from last year's 40 million pounds. Conditions were generally much better than in the last 2 years, resulting in good crops in these four States. While production

Table 8--Apricots : Total production and season-average price received by growers, 1994-96, and indicated 1997 production

Item and State	Production				Price		
	1994	1995	1996	1997	1994	1995	1996
	-- Million pounds --				-- Cents per pound --		
California	290	108	152	250	16.6	19.5	21.2
Utah	0.8	1/	0.6	1/	25.6		44.0
Washington	16	13	7	14	32.0	51.0	67.5
United States	306	121	160	264	17.5	23.0	23.3

1/ No significant production due to frost damage.

Source: National Agricultural Statistics Service, USDA.

Table 9--Plums and prunes: Production and season-average price received by growers in principal States, 1994-96, and indicated 1997 production

Item and State	Production				Price		
	1994	1995	1996	1997	1994	1995	1996
	-- Million pounds --				-- Cents per pound --		
California:							
Plums	494	248	444	na	16.1	47.5	21.0
Prunes (fresh basis)	1,188	1,195	1,408	na	17.7	16.0	14.1
Total California	1,682	1,443	1,852	na			
Prunes (dried basis)	386	362	440	430	54.5	52.0	45.0
Prunes and plums:							
Idaho	9	6	11	8	19.4	31.3	30.0
Michigan	12	15	5	9	8.3	11.5	16.8
Oregon	38	11	12	26	6.4	12.1	17.7
Washington	17	13	12	14	7.5	15.8	22.4
Total 4 States	76	45	40	40	8.4	15.7	22.3
United States	1,758	1,488	1,892	na			

na: Not available.

Source: National Agricultural Statistics Service, USDA.

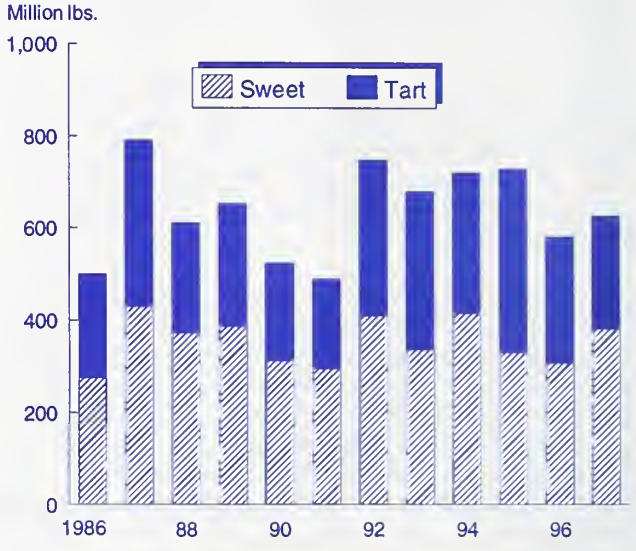
will likely be lower in Idaho, the State's output is still about average. Plum prices this summer are likely to average lower than a year ago given the expected large crop and strong competition stemming from increased supplies of other stone fruits.

Prospects Favorable for U.S. Sweet Cherry Industry

After 2 years of reduced production and lackluster prices, 1997 appears to be profitable for most sweet cherry growers. Relatively improved growing conditions in most sweet cherry-growing areas, especially in the Pacific Northwest, helped the overall performance of the U.S. crop this year—achieving good pollination, heavy fruit sets, and producing cherries of generally good to excellent quality. During 1995 and 1996, cool and rainy weather in the spring hampered pollination and made cherries that were harvested in May extremely vulnerable to skin cracking and fruit splitting—affecting both the size and quality of the U.S. crop. USDA forecasts this year's U.S. sweet cherry production at 382.5 million pounds, 24 percent above a year ago (table 10). Large crop increases are anticipated in Washington, California, Oregon, and Michigan—where about 98 percent of U.S. sweet cherries are produced. These production increases will compensate for smaller crops expected in minor cherry-producing States, such as Idaho, New York, Pennsylvania, and Utah.

The mild winter improved the 1997 sweet cherry crop outlook in Washington and Oregon. Washington's production is forecast at 170 million pounds, up 23 percent from a year ago, and the largest since 1989. Oregon is expected to harvest 86 million pounds, up 34 percent from a year ago. Higher yields in California will put the State's output at 70 million pounds, up 42 percent. Cool, damp weather in Michigan hampered pollination and delayed crop growth, but the sweet cherry crop is still expected to be 9 percent above last year. Cold weather also affected crop development in New York and Pennsylvania, with each State likely producing 7 percent and 13 percent less sweet cherries this year.

Figure 11
U.S. Cherry Production



About half of the U.S. sweet cherry crop is marketed for fresh use. According to USDA's Agricultural Marketing Service, fresh sweet cherry shipments typically run from April through August, with the heaviest shipments during June and July. According to industry sources, early season varieties in California were ready for harvest by April 25 while the Bing varieties were ready for picking beginning May 10. The California sweet cherry harvest was expected to end by June 15. Meanwhile, the Northwestern States were expected to begin harvesting around June 10-12, with peak volume around June 20. New plantings of later varieties in Washington will extend its season until August.

Grower prices for fresh sweet cherries are likely to average lower than last year given the expected large crop. However, the good quality of the crop and continued strong demand, especially from export markets, will help keep prices strong. The season-average grower price for sweet cherries reached a record in 1995 at $1.12 per pound ($2,240 per ton), nearly twice the average in 1994. Fresh use supplies

Table 10--Sweet cherries: Total production and season-average price received by growers, 1994-96, and indicated 1997 production

State	Production				Price		
	1994	1995	1996	1997	1994	1995	1996
	-- Million pounds --				-- Cents per pound --		
California	104.0	39.6	49.2	70.0	61.0	105.0	92.5
Idaho	2.8	1.4	4.4	2.6	72.5	80.5	62.5
Michigan	50.0	54.0	44.0	48.0	29.4	29.1	35.5
Montana	1.5	1.8	1.4	2.0	60.0	60.5	71.0
New York	1.8	2.2	1.4	1.3	42.5	48.0	71.0
Oregon	84.0	76.0	64.0	86.0	36.6	38.3	54.5
Pennsylvania	1.9	2.0	1.6	1.4	92.0	65.0	112.0
Utah	4.6	4.0	4.6	1.2	45.1	43.3	56.5
Washington	164.0	150.0	138.0	170.0	60.0	76.0	89.0
United States	414.6	331.0	308.6	382.5	52.0	63.0	73.5

Source: National Agricultural Statistics Service, USDA.

declined 35 percent in 1995 and the share of exports rose from 33 percent in 1994 to 43 percent. Prices in 1996 held strong but averaged lower as fresh supplies rose and quality declined.

Higher grower prices in recent years have reflected rising export demand for sweet cherries. Between 1990 and 1996, the United States exported about 35 percent of its fresh-use supply, compared with 25 percent in 1985-89 and 14 percent in 1980-84. Japan is the largest market for U.S. sweet cherries, with an average of 56 percent of U.S. export volume over the past 3 years. Canada, the European Union, Taiwan, and Hong Kong are also important markets.

The potential to sustain strong export demand for U.S. sweet cherries will be aided by the recent opening of mainland China to Washington cherries. China agreed to grant access to Washington sweet cherries back in April 1995. In June 19, 1997, the first official shipments of Washington sweet cherries arrived in Shanghai, following a recent signing of a modified work plan for Washington sweet cherry exports to China. Under the modified work plan, if a shipment is detected to carry a Western cherry fruit fly, the lots of cherries in that shipment should be either fumigated, reexported, or destroyed. In addition, only the packing facility where the cherries originated would be suspended from the program until investigation and corrective measures are undertaken. With the previous work plan, the entire program would be suspended. Currently, Washington is the only State that has been allowed access to the Chinese market, but Idaho, Oregon, and California may soon follow. Initial shipments to China are likely to be small because many Chinese consumers are still unfamiliar with the product and the high tariffs may also serve as a barrier to importing large quantities. Under the trade protocol, Washington sweet cherries will face a tariff of 48 percent ad valorem, plus a 17 percent value-added tax. Despite these obstacles, the U.S. sweet cherry industry is optimistic about the opportunity to develop China as a new market for its product.

Cold Weather Reduces 1997 Tart Cherry Crop

The 1997 U.S. tart cherry crop is forecast to decline 10 percent from a year ago to 242.2 million pounds, the lowest since 1991's 189.9 million pounds (table 11). Cold weather in the spring affected major tart cherry growing States such as Michigan, Utah, Washington, New York, and Pennsylvania, causing frost damage in some areas and reducing yields in others. The Michigan crop, making up over 70 percent of the Nation's production, is expected to be 8 percent short of last year's 195 million pounds and 42 percent below the 1995 crop. Except for Wisconsin and Oregon, other tart cherry growing States are also expected to harvest smaller crops this year (table 11). The U.S. tart cherry harvest season usually begins in early July in most areas and extends into August.

Most tart cherries produced in the United States are processed. Due to the smaller U.S. crop, processing use in 1997 will likely be down from a year ago and processors are likely to pay higher prices. However, slightly higher stocks could offset some of the price effects of reduced production. As of May 30, 1997, stocks of frozen tart cherries were running 2 percent higher than a year ago. Last year, the decline in production reduced processing use 17 percent from a year earlier to 256.1 million pounds, with all processing categories (canned, frozen, and other) down from the previous year. Frozen tart cherries are the largest category in the U.S. tart cherry processing sector, accounting for about two-thirds of the total volume processed. Frozen tart cherry supplies fell 6 percent to 180.7 million pounds in 1996 and processors paid 15.2 cents per pound for these cherries, up from 5.5 cents in 1995.

Nearly 1 percent of the U.S. tart cherry crop is for fresh use. In 1996, fresh use fell 7 percent from a year earlier to 2.5 million pounds. Tart cherry growers received an average of 48.1 cents a pound for fresh-market cherries in 1996, up from 44.4 cents in 1995. As with processing use, fresh-market production in 1997 will likely be lower than a year ago due to reduced production, likely leading to higher fresh-market grower prices.

Beginning this year, the production and marketing of tart cherries in the United States will be covered under the terms of a newly established Federal marketing order (Federal Register, 61 (186)). In the past, fluctuations in U.S. tart cherry production and the fairly inelastic demand for the product have created wide swings in tart cherry prices. The objective of the marketing order is to provide supply stability in the market so that price swings can be moderated.

Table 11--Tart cherries: Total production and season-average price received by growers, 1994-96, and indicated 1997 production

State	Production				Price		
	1994	1995	1996	1997	1994	1995	1996
	-- Million pounds --				-- Cents per pound --		
Colorado	1.5	1.2	1.0	0.7	35.5	41.4	47.3
Michigan	210.0	310.0	195.0	180.0	17.0	5.4	16.0
New York	26.0	32.0	19.0	14.5	12.4	5.6	8.1
Oregon	8.0	1.6	2.5	3.2	15.6	11.3	20.6
Pennsylvania	9.0	9.5	7.5	5.0	26.5	10.7	22.7
Utah	26.5	22.0	25.0	14.0	10.3	4.8	12.6
Washington	14.0	11.6	14.2	14.0	17.6	11.9	16.3
Wisconsin	9.2	7.7	6.1	10.8	12.7	6.3	17.8
United States	304.2	395.6	270.3	242.2	16.3	5.9	15.7

Source: National Agricultural Statistics Service, USDA.

This will be done by setting an optimum market supply of tart cherries, primarily through the use of an inventory reserve system where excess production in one year is reserved for years of underproduction. Supply and price stability in the market will guarantee the survival of a large number of producers and handlers in the industry.

Reduced Strawberry Production Boosts Prices in 1997

Commercial strawberry production in the six major producing States—California, Florida, Oregon, Washington, Michigan, and New Jersey—is forecast at 1.52 billion pounds in 1997, down 4 percent from a year ago (table 12). Favorable winter and spring weather produced an average-sized crop in California. Record high yields in the State were offset by a reduction in area harvested, putting the 1997 crop at 1.27 billion pounds, 7 percent below last year. Yields in California are forecast to average 56,000 pounds per acre, up 4 percent from a year ago, while total area harvested is expected at 22,600 acres, down from 25,200 last year. Florida's 1997 strawberry production is forecast at 183 million pounds, up 17 percent from last year, with 100 more acres harvested and yields up 15 percent. The use of overhead sprinklers protected many Florida growing areas from a severe freeze on January 18-19, 1997, resulting in no significant damage to the State's winter crop. Combined production in California and Florida makes up more than 90 percent of the U.S. strawberry crop.

Table 12--U.S. strawberry production, major States, 1993-97

States	1993	1994	1995	1996	1997
	Million pounds				
Arkansas	0.7	0.5	1.2	0.4	na
California	1,142.1	1,328.1	1,296.0	1,360.8	1,265.6
Florida	162.4	168.2	168.0	156.0	183.0
Louisiana	11.0	15.4	9.5	6.4	na
Michigan	11.4	9.9	10.2	6.0	8.3
New Jersey	1.8	1.4	1.5	1.6	1.6
New York	16.2	10.4	8.4	8.2	na
North Carolina	10.8	15.6	19.2	16.1	na
Ohio	6.4	6.1	5.0	3.6	na
Oregon	62.0	70.2	59.9	47.8	54.6
Pennsylvania	5.4	6.3	6.4	5.6	na
Washington	11.2	11.2	10.4	10.5	10.5
Wisconsin	5.7	6.1	5.5	4.4	no
U.S. total	1,447	1,649	1,601	1,627	na

na : Not available.

Source: National Agricultural Statistics Service, USDA.

Next to California, Oregon is the second largest strawberry producer during the spring/summer season. Higher yields in this State are expected to boost its 1997 production 14 percent above a year ago to 54.6 million pounds. Harvested area was unchanged from last year at 5,200 acres, but average yields increased from 9,200 pounds per acre in 1996 to 10,500 pounds in 1997.

Weather conditions in Washington, particularly during the winter and spring, diminished the prospects of increased strawberry production in the State in 1997. Washington's new crop forecast is set at 10.5 million pounds, unchanged from last year. While harvested acreage increased 100 acres to 1,400 in 1997, average yields dropped from 8,100 pounds per acre in 1996 to 7,500 pounds this year. A wet and cold winter and spring led to flooding of some fields, causing some damage to the crop and delaying the harvest. In some growing areas, harvest was delayed due to lack of pickers. There is a relatively short window between when strawberries are ready to be harvested and when they become over-ripe.

In Michigan, the strawberry crop is forecast to be 8.3 million pounds, up 38 percent from last year. The crop was slow to develop due to very cold temperatures in May. The New Jersey crop is forecast to be unchanged from last year's 1.6 million pounds, but it achieved good fruit size and quality.

Despite reduced production in the six major States, fresh strawberry shipments (including imports) from January through June 1997 were up fractionally from the same period last year as shipments from Florida were up sharply (table 13). In Florida, most berries are typically shipped in March. Berries from California are available throughout the year, but shipments are the heaviest around April through June. Fresh shipments from California declined sharply in June from a year ago and are expected to be lower for the rest of the year. Aside from the smaller 1997 California

Table 13--Fresh strawberry shipments in the United States, monthly, by source, 1992-97

Source/year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
						Million pounds							
California													
1992	6.7	16.9	52.1	187.5	175.5	102.5	85.7	49.5	47.2	33.8	5.2	1.5	764.1
1993	3.5	11.6	61.4	149.3	158.6	123.2	93.0	69.0	64.9	31.9	46.2	1.2	813.8
1994	13.7	20.1	68.7	172.8	177.3	138.7	108.3	90.4	69.8	40.6	8.2	0.8	909.4
1995	0.6	17.2	46.8	149.7	159.5	145.0	114.1	77.8	70.3	46.7	11.3	1.4	840.4
1996	19.2	26.9	71.4	209.7	175.3	115.3	112.3	79.2	54.2	51.2	8.5	1.6	924.8
1997	8.0	24.7	91.8	212.2	176.1	98.7							
Florida													
1992	8.4	16.1	26.4	8.3	0.3	--	--	--	--	--	0.4	4.1	64.0
1993	10.5	8.5	24.7	7.4	2.5	--	--	--	--	--	0.3	4.0	57.9
1994	7.5	13.2	33.0	2.8	--	--	--	--	--	--	0.4	3.0	59.9
1995	4.7	5.4	23.0	4.1	--	--	--	--	--	--	0.1	5.1	42.4
1996	7.4	9.2	35.6	8.1	0.1	--	--	--	--	--	0.5	10.5	71.4
1997	24.8	47.4	31.2	0.4	--	--	--	--	--	--			
Mexico													
1992	1.8	2.1	5.3	4.8	1.9	0.7	0.1	--	--	--	0.7	1.8	19.2
1993	2.3	2.3	9.0	5.6	4.7	2.2	--	--	--	--	0.3	1.6	28.0
1994	3.2	3.4	11.6	12.8	5.5	4.5	0.2	--	--	0.1	0.8	1.9	44.0
1995	3.2	5.3	12.3	11.6	11.5	8.4	0.7	--	--	0.1	0.8	1.5	55.4
1996	5.2	7.7	13.4	21.4	11.4	1.7	--	--	--	--	0.9	2.2	63.9
1997	5.1	5.9	12.3	4.9	0.3	--							
Total													
1992	16.9	35.1	83.8	200.6	177.7	103.2	85.8	49.5	47.2	33.8	6.3	7.4	847.3
1993	16.3	22.4	95.1	162.3	165.8	125.4	93.0	69.0	64.9	31.9	46.8	6.8	899.7
1994	24.4	36.7	113.3	188.4	182.8	143.2	108.5	90.4	69.8	40.7	9.4	5.7	1,013.3
1995	8.5	27.9	82.1	165.4	171.0	153.4	114.8	77.8	70.3	46.8	12.2	8.0	938.2
1996	31.8	43.8	120.4	239.2	186.8	117.0	112.3	79.2	54.2	51.2	9.9	14.3	1,060.1
1997	37.9	78.0	135.3	217.5	176.4	98.7							

-- = No shipments reported.

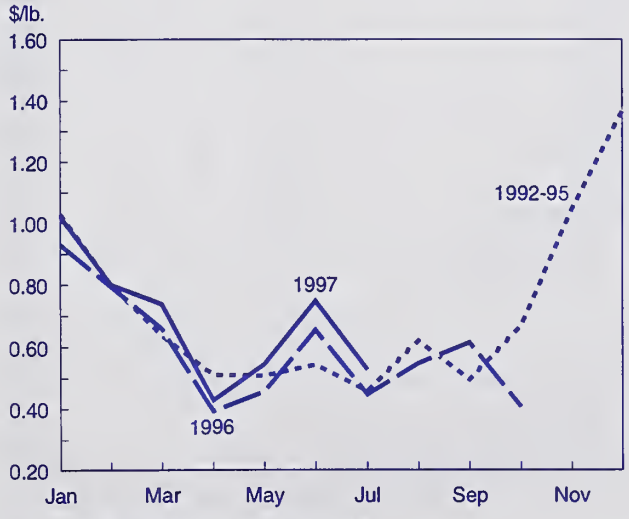
Source: National Agricultural Statistics Service, USDA.

crop, June shipments were also influenced by the hot, humid weather in May that caused some quality problems and disrupted crop maturity.

Expected reduced fresh-market supplies point to higher grower and retail prices for fresh-market strawberries in 1997. Monthly grower prices from January through July 1997 averaged 67 cents per pound, compared with 62 cents the year before. At the same time, grower prices declined seasonally from $1.02 per pound in January to 52.7 cents in July. According to industry sources, strong demand in May and June caused prices to move up, but slow demand after the Fourth of July weekend pushed prices lower. June prices were also affected by reduced California shipments. For the rest of the summer, competition with plenty of stone fruits and oranges will likely put additional downward pressure on strawberry prices. Retail prices from February through June 1997 followed the seasonal movement in grower prices, and averaged $1.26 per pound, compared with $1.20 in 1996. Expected higher fresh strawberry prices in 1997, lower prices for other fresh fruits, and likely lower imports could lead to reduced domestic consumption in 1997. Last year, increased fresh-market supplies and lower prices helped boost domestic demand, with U.S. consumption estimated at 4.39 pounds per person, up from 4.15 pounds in 1995.

Figure 12

U.S. Grower Prices for Fresh Strawberries

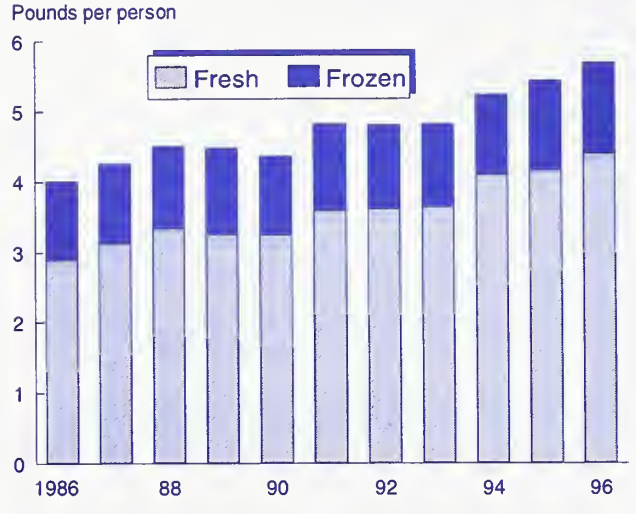


No price reported for November and December 1996.

Processing prices could average unchanged to slightly lower than a year ago as carryover stocks (as of December 31, 1996) were down 17 percent from the prior year. Stocks of frozen strawberries have been lower through May 31, 1997. With the California season underway, stocks of frozen strawberries as of June 30, 1997, were up 7 percent from a year ago and season-to-date deliveries of grade-1 freezer berries to processors were 2 percent higher as of July 26.

Even with reduced production, U.S. imports of fresh strawberries will likely be lower than a year ago in 1997 due mainly to the smaller 1996/97 (November-June) crop in Mexico, the main foreign supplier. According to the USDA's Foreign Agricultural Service, Mexican exports of

Figure 13
U.S. Strawberry Consumption



Fresh-weight equivalent.

fresh strawberries are expected to be down 14 percent in 1996/97 from a year earlier. The 1996/97 Mexican crop is forecast to be 15 percent smaller than the prior season due to a decline in planted acreage, heavy rains during the bloom stage, and a frost in January 1997. Mexico ships mainly to the United States beginning around November and extending through July of the following year. Shipments of fresh-market strawberries from Mexico totaled 28.5 million pounds from January through June 1997, compared with 60.8 million pounds a year earlier (table 13). U.S. imports of frozen strawberries during the first 5 months of 1997, on the other hand, were up 4 percent when U.S. frozen inventories were running below a year ago. Frozen imports increased from Mexico, Chile, and Canada.

U.S. fresh strawberry exports are shipped mainly to Canada, Japan, Mexico, and the United Kingdom. During 1996, fresh exports totaled 116.0 million pounds, up 4 percent from the year before. The four major U.S. export markets accounted for 76 percent, 12 percent, 4 percent, and 4 percent, respectively of the total volume. Prospects for improved exports in 1997 will be stifled by the expected smaller U.S. crop, the stronger U.S. dollar, and the forecast of increased production in Canada in 1996/97. Fresh exports during January-May 1997 were down 2 percent from the same period last year, with reduced exports to Canada and the United Kingdom. U.S. exports of frozen strawberries totaled 46.9 million pounds in 1996, down 12 percent from a year earlier, reflecting lower U.S. supplies of frozen strawberries (including imports and carryover inventories) and strong domestic demand. Most of these shipments went to Japan (71 percent), Canada (19 percent), Mexico (4 percent), and Australia (3 percent). Exports declined mainly to Canada, Australia, and many of the Asian countries, including Japan. Frozen exports from January through May 1997 were down 16 percent from the same period last year, with reduced shipments to Japan and Mexico.

Blueberry Supplies Move Upward in 1997

Good crops in most major blueberry-producing States have provided ample blueberry supplies all through the summer of 1997. Given the projected size of the U.S. cultivated blueberry crop, blueberry prices are likely to average lower than a year ago. Preliminary estimates from the North American Blueberry Council (NABC) put the 1997 U.S. cultivated blueberry crop at 144.4 million pounds, 12 percent above last year. Domestic production of cultivated blueberries is expected to increase in most blueberry-producing States, including Michigan and New Jersey, where more than 50 percent of the cultivated varieties are produced (table 14). A June rainstorm that passed through the Southwest Michigan region only delayed harvest of the early varieties and generally much of the crop pollinated well. Production in the Southeast, particularly Florida, Georgia, and North Carolina, was tempered by a cold, wet spring, affecting mainly the early varieties and delaying harvest. Improved weather for the late varieties, however, has led to increased blooms and good yields. Production in Florida and Georgia was relatively unchanged from last year, but in North Carolina, production was much smaller than a year ago. The critical pollination period in the State also experienced high winds and cloudy weather that led to a small bloom set of the early varieties.

Fresh-market production makes up about 47 percent of all cultivated blueberries in the United States. According to NABC estimates, U.S. blueberries for fresh use will likely be up 6 percent from a year ago in 1997, attributed mainly

Table 14--North American blueberry production, 1994-97

State of Province	1994	1995	1996	1997F
	Million pounds			
Cultivated:				
Michigan	47.0	67.0	42.0	49.0
New Jersey	32.5	36.0	35.0	36.0
British Columbia	28.2	30.9	34.9	27.0
Oregon	17.5	14.0	17.0	20.0
North Carolina	15.0	14.4	12.0	8.3
Washington	9.0	6.6	8.7	8.0
Georgia	9.0	14.0	6.0	12.0
Other	11.7	12.3	9.9	12.1
Total	169.9	195.1	165.5	172.4
U.S.	140.6	163.2	129.3	144.4
Wild:				
Maine	59.5	65.9	59.2	na
Nova Scotia	27.5	30.2	29.6	na
Quebec	15.9	16.3	23.1	na
New Brunswick	10.5	9.0	11.5	na
Newfoundland and	1.4	1.508	2.5	na
Prince Edward Island	2.6	1.6	2.2	na
Total	114.7	124.5	128.2	na
Total U.S.	200.1	229.1	188.5	na

na: Not available.
F = Forecast from the North American Blueberry Council.
Sources: National Agricultural Statistics Service, USDA
and the North American Blueberry Council (Maine and Canada).

to the increase in New Jersey's production. New Jersey is the largest source of fresh blueberries, providing about one-third of fresh-market use during 1994-96. Fresh-market production in the State is expected to reach 26 million pounds in 1997, 13 percent above a year ago and New Jersey's share of U.S. fresh-market use will rise to 41 percent. New Jersey's crop is usually harvested beginning in June, reaching a peak by mid-July. Shipments of New Jersey fresh blueberries were slow in June as rains put harvesting a little behind schedule. As of the third week of July, shipments started to pick up and were already running 87 percent of last season's July volume (table 15).

In Michigan, fresh-market blueberry production will be 15 million pounds, up 11 percent from last year and will account for 24 percent of U.S. fresh-market use. Fresh blueberry shipments from Michigan begin around early July and usually last through September or early October. Shipments of Michigan blueberries were a week to 10 days behind, but as of mid-July had already surpassed last year's by more than 50 percent. USDA's estimate of U.S. cultivated blueberry fresh-market production in 1996 was 62.2 million pounds, down 17 percent from a year earlier, with poor crops in New Jersey and Michigan. In response to the decline in fresh-market production, the season-average grower price for fresh-market blueberries rose from 90.4 cents a pound in 1995 to $1.06 per pound in 1996 (table 16).

Frozen blueberry supplies (cultivated and wild varieties) from the domestic crop come mainly from Maine and Michigan. Maine produces only wild blueberries, mostly for freezing, and accounts for the largest share of processed berries. Production in the State this year remains uncertain (through August 19). Growing conditions were good to excellent through most of the season—the winter was not too harsh and there was good pollination. However, a dry spell in early August, the beginning of harvest for wild blueberries, has delayed crop maturity. According to the Wild Blueberry Association, the berries are not sizing and ripening well and output may range from 50 to 55 million pounds, compared with 59 million in 1996. Less than 10 percent of Maine's production goes to the fresh market. In Michigan, 69 percent of this year's cultivated blueberries will be processed, up 26 percent from a year ago. Processors may end up paying higher prices for blueberries, given the potentially smaller crop in Maine and below-average carryover inventories. USDA reported that U.S. stocks of frozen blueberries on January 1, 1997, were 17 percent below a year earlier, and 22 percent below the 1991-95 average.

U.S. imports of frozen and fresh blueberries will likely decline beginning in second-half 1997 as domestic supplies from the new large crop become available. Cumulative imports of frozen blueberries during January-May 1997 totaled 11.6 million pounds, up 85 percent from the same

Table 15--U.S. blueberry shipments, monthly, 1992-97

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
							Million pounds						
All 1/													
1992	0.2	0.2	0.1	0.1	1.1	6.8	16.5	20.3	3.5	1.0	0.8	0.2	50.8
1993	0.3	0.1	--	--	1.5	12.2	22.9	25.6	3.2	--	--	0.2	66.0
1994	0.3	0.3	0.1	0.8	6.7	12.5	24.7	23.6	1.7	0.1	--	0.2	71.1
1995	0.7	0.2	0.2	0.2	6.5	12.2	32.7	23.1	2.6	0.1	--	0.3	78.8
1996	0.8	0.6	0.4	0.1	3.2	13.5	23.0	20.1	4.4	0.6	0.2	0.5	67.4
1997	0.9	0.4	--	0.7	5.6	6.9							
Florida													
1992	--	--	--	0.1	0.6	0.2	--	--	--	--	--	--	0.9
1993	--	--	--	--	0.1	--	--	--	--	--	--	--	0.1
1994	--	--	--	0.8	1.0	--	--	--	--	--	--	--	1.8
1995	--	--	--	0.2	1.2	0.1	--	--	--	--	--	--	1.5
1996	--	--	--	0.1	0.7	0.5	--	--	--	--	--	--	1.3
1997	--	--	--	0.7	0.7	--							
North Carolina													
1992	--	--	--	--	0.5	6.1	0.1	--	--	--	--	--	6.7
1993	--	--	--	--	1.4	8.8	0.8	--	--	--	--	--	11.0
1994	--	--	--	--	6.8	7.6	0.5	--	--	--	--	--	13.9
1995	--	--	--	--	5.3	7.0	0.4	--	--	--	--	--	12.7
1996	--	--	--	--	2.5	8.1	0.3	--	--	--	--	--	10.9
1997	--	--	--	--	4.9	3.6							
New Jersey													
1992	--	--	--	--	--	0.4	10.1	2.5	--	--	--	--	13.0
1993	--	--	--	--	--	3.4	15.2	2.1	--	--	--	--	20.7
1994	--	--	--	--	--	4.9	15.1	1.1	--	--	--	--	21.1
1995	--	--	--	--	--	4.9	21.0	2.4	--	--	--	--	28.3
1996	--	--	--	--	--	4.9	16.8	0.4	--	--	--	--	22.1
1997	--	--	--	--	--	3.3							
Michigan													
1992	--	--	--	--	--	--	2.2	5.7	1.9	0.1	--	--	9.9
1993	--	--	--	--	--	--	6.0	10.9	1.7	--	--	--	18.6
1994	--	--	--	--	--	--	6.6	7.2	1.4	--	--	--	15.2
1995	--	--	--	--	--	--	6.4	9.1	1.4	--	--	--	16.9
1996	--	--	--	--	--	--	4.4	7.8	2.6	0.3	--	--	15.1
1997	--	--	--	--	--	--							

-- = No shipments reported.

1/ Includes imports from Canada, Chile, and New Zealand.

Source: Agricultural Marketing Service, USDA.

Table 16--Blueberry prices received by growers, 1994-96

Use and state	1994	1995	1996
	Cents per pounds		
All Uses:			
Michigan	53.6	49.9	86.5
New Jersery	73.7	75.7	97.1
North Carolina	92.5	90.9	101.0
Oregon	51.8	49.3	75.0
Washington	48.2	49.1	68.9
U.S. average	66.4	63.7	90.7
Fresh:			
Michigan	74.0	75.0	100.0
New Jersery	86.0	88.0	100.0
North Carolina	105.0	105.0	109.0
Oregon	73.0	71.0	92.5
Washington	62.0	77.0	89.0
U.S. average	90.2	90.4	106.0
Processed:			
Michigan	44.0	40.0	79.0
New Jersery	49.0	45.0	91.0
North Carolina	42.6	39.0	67.0
Oregon	34.0	33.0	65.5
Washington	42.0	38.0	64.0
U.S. average	42.9	40.0	75.6

Sources: National Agricultural Statistics Service, USDA

period last year. At the same time, U.S. imports of fresh blueberries totaled 2.2 million pounds, up 29 percent. The increase in total imports (frozen and fresh) during the first 5 months of 1997 may be attributed to the small 1996 U.S. blueberry crop. Fresh use and processing use of domestic production fell 17 percent and 25 percent, respectively. Virtually all frozen blueberry imports come from Canada, but Sweden, Mexico, and Chile also ship small quantities to the United States. Canada is also a major supplier of fresh blueberries to the United States, accounting for about 87 percent of the fresh volume imported in 1996. Other U.S. suppliers of fresh blueberries are Chile, New Zealand, and to some extent, Mexico.

Despite reduced supplies (including imports and beginning stocks) last year, strong demand from key export markets raised U.S. frozen blueberry exports 49 percent above a year earlier in 1996. U.S. shipments of frozen blueberries to Canada were up 134 percent and accounted for nearly 50 percent of all frozen exports. Frozen exports to other major markets also rose sharply, including those to Japan (up 132 percent), the United Kingdom (up 83 percent), France (387 percent), and Italy (up 25 percent). Exports to Germany and to the Netherlands, also major destinations for U.S. frozen blueberries, declined 13 and 58 percent, respectively.

U.S. fresh blueberry exports were down 19 percent, to 7.3 million pounds in 1996. A surge in fresh exports to Germany and the United Kingdom were offset by declines to Canada (down 36 percent), the largest U.S. market, and to other major markets such as the Netherlands (down 13 percent), Switzerland (down 38 percent), and Italy (down 28 percent). Increased supplies coming into the second half of 1997 and expected lower prices this year will help the U.S. blueberry industry meet and promote export demand. Exports of frozen blueberries during the first 5 months of 1997 were down 45 percent, reflecting low inventories and the small 1996 production. At the same time, fresh exports were up 3 percent.

California Kiwifruit Production Returns To Normal in 1997

Preliminary fruit counts from the California Kiwifruit Commission (CKC) indicate that California's 1997 kiwifruit production will be up from last year and will be about average in size. Last year, the shortage of chilling hours from the winter of 1996 caused erratic flowering that consequently led to poor pollination and a low fruit set. Production declined 17 percent from a year earlier in 1996 to 63 million pounds, the industry's smallest crop since 1991. Fruit size was also below normal. Growing conditions for the upcoming new crop have improved relative to last year in some areas. Kiwifruit vineyards in the northern portion of the State received adequate chilling hours this winter and the crop appears to be consistently heavier. Vineyards in central California, on the other hand, had a shortage of chilling hours. However, growers in the area generally reported a good set, aided mainly by spraying Dormex, approved for use in California beginning this year. The application of Dormex causes flower buds to bloom early and uniformly, aiding in achieving a heavier fruit set and larger sized fruits. According to the CKC, about 50-75 percent of the kiwifruit growers in central California used Dormex in their vineyards for the first time this year. California's kiwifruit crop is harvested in October and November and marketed through the following May.

If the expected increase in this year's production is realized, fresh kiwifruit grower prices will likely decline in 1997. Lower prices and expectations of good fruit quality from the use of Dormex will help boost kiwifruit consumption in the domestic and international markets. U.S. fresh kiwifruit imports rose 5 percent from a year earlier in 1996, but the smaller California crop pushed domestic supplies down 22 percent. Consequently, the season-average grower price for fresh-market kiwifruit increased from 23.7 cents a pound ($473 per ton) in 1995 to 25.1 cents ($502 per ton) in 1996 (table 17). The large decline in domestic production more than offset the rise in grower prices, causing the value of the 1996 crop to drop about $1.7 million from a year earlier to $13.4 million.

As a net importer of kiwifruit, the United States imported 88.0 million pounds in 1996, and exported 12.7 million

Table 17--California kiwifruit: Acreage, production, and value, 1992-96

Year	Bearing acreage	Total production	Price	Value 2/
	Acres	Million pounds	Cents per pounds	$1,000
1992	7,300	104.6	14.5	13,833
1993	7,200	98.4	18.5	16,502
1994	6,900	78.8	24.6	18,413
1995	6,600	76.0	23.7	15,089
1996	6,600	63.0	23.9	13,368

1/ Season-average grower price. 2/ Value is based on utilized production.
Source: National Agricultural Statistics Service, USDA.

Table 18--U.S. imports of fresh kiwifruit, by country, 1992-96

Sources	1992	1993	1994	1995	1996
	1,000 pounds				
Chile	27,141	42,871	54,778	74,002	69,730
New Zealand	16,435	10,542	6,360	7,341	9,823
Italy	1,036	1,863	1,550	2,202	7,913
Other countries	0	2	91	2	527
World	44,613	55,279	62,779	83,548	87,994

Source: Bureau of the Census, U.S. Department of Commerce.

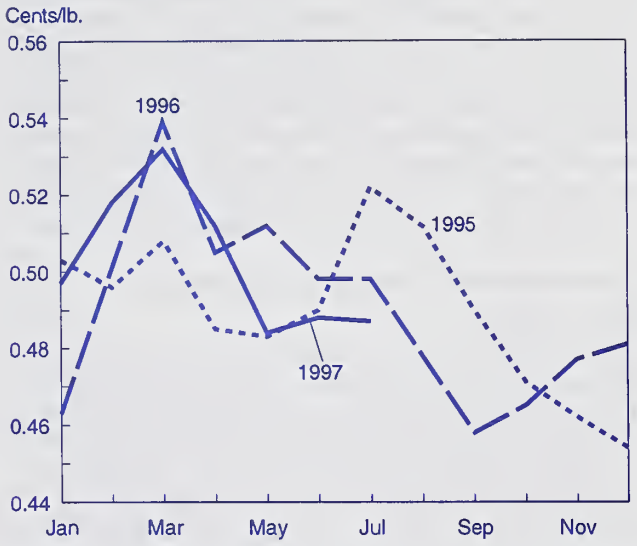
pounds (table 18). Imports originated mainly from Chile (79 percent), New Zealand (11 percent), and Italy (9 percent). France, Greece, the Netherlands, and Canada also shipped small amounts of fresh kiwifruit to the United States. Among the three major U.S. suppliers, imports from Italy in 1996 more than doubled from a year earlier, shipments from New Zealand were up 33 percent, while the volume coming from Chile declined 6 percent. U.S. kiwifruit imports peak around April and end in October when the California season begins. Cumulative imports from January through May 1997 totaled 46.2 million pounds, down 16 percent from the same period a year ago.

Lower domestic supplies partly contributed to the decline in U.S. fresh kiwifruit exports in 1996. Exports fell 27 percent from a year earlier, with smaller shipments to key markets such as Canada (down 12 percent), Korea (down 36 percent), and Taiwan (down 66 percent). These markets account for more than 85 percent of total U.S. fresh kiwifruit exports. Continued strong competition with Italy, Greece, and France for the Canadian market, increased production in Korea, and more attractively priced kiwifruit from France in the Taiwanese market are also strong factors behind the lower exports last year. Total exports from January through May 1997 were down 9 percent from the same time in 1996, partly reflecting the small California crop harvested last fall. The increase to a more normal crop in 1997 will likely help raise U.S. fresh kiwifruit exports in 1998.

Banana Consumption Continues To Climb

Banana consumption reached a record 28.2 pounds per person in 1996, up 3 percent from the previous year. Bananas continued to be the most popular fresh-market fruit consumed in the United States, followed by apples and oranges.

Figure 14
Bananas: Retail Prices



Contributing to high banana consumption were record imports totaling 7.5 billion pounds. Retail prices for bananas averaged 50 cents a pound in 1996, about the same as a year earlier. Americans consume the largest quantity of bananas in the winter and spring months. Consumption drops off as U.S. summer fruits enter the market. During January to June 1997, U.S. retail prices for bananas averaged 51 cents a pound, up from 50 cents a pound in 1996. Retail prices continue to trend upward, although the rate of increase appears to be slowing. Competition from imported grapes, apples, and stonefruit, as well as large domestic supplies of citrus, has helped slow the increase in banana prices.

Almost all bananas consumed in the United States are from South and Central America (table 19). Costa Rica continues to provide the largest share of fresh bananas for the U.S. market, accounting for 26 percent of total imports. Ecuador remains the second largest source. However, its share fell in 1996 to 22 percent, down from 25 percent in 1995. Honduras became the third largest banana supplier to the United States as imports from Colombia, previously the third most important source, declined for the third consecutive year.

Production in Hawaii, the only place in the United States that produces bananas, stayed level with the previous year's utilized production at 13 million pounds, less than 1 percent of domestic supply. Banana acreage increased in 1996

Table 19--U.S. imports of bananas, excluding plantains, by country, 1989-96

Year	Costa Rica	Ecuador	Honduras	Guatemala	Colombia	Panama	Mexico	Other	World
					Million pounds				
1989	1,404.6	1,873.1	1,216.3	535.2	939.7	256.7	208.5	3.5	6,437.6
1990	1,260.1	2,518.0	1,070.6	733.5	787.7	101.7	334.7	15.2	6,821.4
1991	1,513.1	2,458.1	917.8	649.8	1,000.8	80.4	475.0	23.8	7,118.8
1992	2,104.3	1,975.9	905.4	842.8	917.2	81.7	873.1	84.7	7,785.0
1993	2,033.8	1,678.5	940.6	832.9	1,314.7	169.3	679.8	95.6	7,745.2
1994	2,154.1	1,732.6	1,096.2	969.9	1,387.8	342.2	422.6	38.4	8,143.8
1995	2,112.3	2,053.7	1,284.7	1,021.5	969.1	279.9	343.2	13.0	8,077.3
1996	2,138.5	1,871.2	1,410.1	1,113.6	841.2	580.4	312.3	59.5	8,326.8

Source: Bureau of the Census, U.S. Department of Commerce.

to 1,040 acres. Production, however, was limited by high winds and cold temperatures both early and late in the year, as well as lower yields from young plantings. Hawaiian banana growers received an average of 40 cents a pound for a total crop value of $5.2 million in 1996, the same as 1995. Locally grown bananas accounted for about 44 percent of Hawaiian banana consumption. Bananas grown in Hawaii cannot be shipped to the U.S. mainland because of problems with the Mediterranean fruit fly. Hawaiian bananas are either consumed locally or occasionally exported to countries such as Canada, where the fruit fly could not survive.

Consumption of Mangoes Continues To Increase

U.S. mango consumption has been growing rapidly in recent years, increasing about 19 percent annually since 1993. In 1996, per capita mango consumption reached a record 1.36 pounds. In 1995, U.S. per capita consumption of fresh mangoes exceeded that of numerous other fresh fruits, including apricots, cherries, cranberries, kiwifruit, papayas, plums, and prunes. Indications are this trend continued in 1996.

Florida's mango production declined one-third from a year earlier to 5.5 million pounds. Bearing acreage remained the same as in 1995, but disease and bloom problems limited fruit set in 1996. Florida's mango industry still has not recovered from the effects of Hurricane Andrew, which hit the State's east coast in 1992, destroying or weakening trees. Decreased production contributed to a 30-percent higher grower price, at $15.00 per ton in 1996. Despite higher prices, the lower production caused a decline in the value of the 1996 crop to $1.5 million, down 13 percent from 1995.

To meet growing domestic demand and offset lower Florida production, mango imports rose 21 percent in 1996 (table 20). Mexico is the principal source for the U.S. market, accounting for 81 percent of mango imports in 1996, totaling 311.7 million pounds, 22 percent above 1995. Haiti, Guatemala, and Brazil were the next major sources, each providing over 1 million pounds.

Figure 15

U.S. Fresh Mango Supply and Consumption

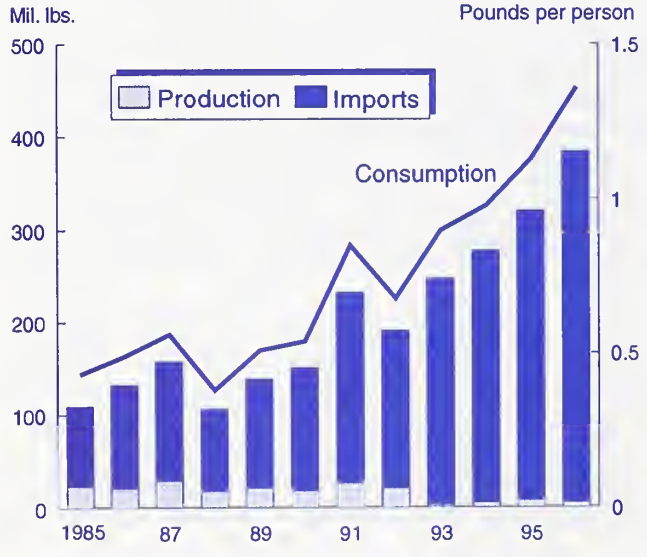


Table 20--U.S. imports of fresh mangoes, by country, 1992-96

Country	1992	1993	1994	1995	1996
	1,000 pounds				
Mexico	151,083	211,137	241,040	256,296	311,683
Haiti	611	18,442	8,417	22,077	18,184
Guatemala	0	1,393	5,258	12,833	15,221
Brazil	3,772	6,973	4,859	6,515	10,774
Peru	6,698	6,063	7,862	8,505	9,897
Ecuador	822	730	1,933	3,285	8,649
Venezuela	5,831	6,259	7,410	4,621	5,139
Nicaragua	0	0	395	1,651	2,081
Costa Rica	49	82	185	150	963
Dominican Republic	183	302	384	287	313
Other countries	190	317	238	373	328
World	169,238	251,697	277,981	316,593	383,232

Source: Bureau of the Census, U.S. Department of Commerce.

U.S. mango imports are likely to increase in 1997. From January to May, imports have risen 8 percent, with shipments in April and May providing most of the increase. If the present trend continues, 1997 should set another record for mango imports.

Papaya Imports Continue To Increase as Hawaii's Production Steadily Declines

In 1996, fresh papaya imports increased 72 percent from 1995, boosting domestic consumption to more than half a pound per person annually. Papaya consumption has been growing steadily since 1991 when it was 0.17 pound per person versus 0.55 pound in 1996, a 224-percent increase. To meet the increased demand for fresh papayas by American consumers, imports have been growing rapidly. In 1996, imports rose to 126 million pounds, 72 percent over 1995 imports (table 21). Mexico is the principal source for U.S. papayas, with 88 percent of the import market. Other major suppliers include Belize, Jamaica, Dominican Republic, and Costa Rica; each providing over 2 million pounds during the year.

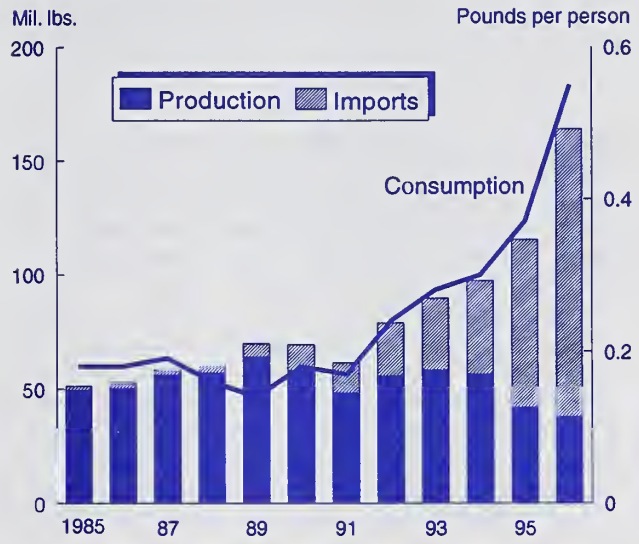
Hawaii's papaya production has been decreasing over the last several years. In 1996, fresh production fell to 37.8 mil-

Table 21--U.S. imports of fresh papayas, by country, 1992-96

Country	1992	1993	1994	1995	1996
	1,000 pounds				
Mexico	18,615	21,533	32,996	67,156	110,661
Belize	1,347	4,297	3,962	1,438	5,347
Jamaica	2,324	4,509	2,588	3,462	5,244
Dominican Republic	768	683	783	1,251	2,517
Costa Rica	4	11	796	19	2,134
Panama	0	0	0	0	106
Honduras	0	0	0	5	42
Thailand	35	10	12	1	18
Haiti	0	250	17	14	4
Bahamas	0	0	0	31	0
Other countries	1	7	22	11	23
World	23,094	31,301	41,176	73,388	126,095

Source: Bureau of the Census, U.S. Department of Commerce.

Figure 16
U.S. Fresh Papaya Supply and Consumption



lion pounds, 10 percent below a year earlier. Papayas used for processing fell 55 percent to 4 million pounds. The chronic problem of papaya ringspot virus has continued to reduce yields, lowering the overall level of utilized production. While statistics show a decline in harvested acres because of land being taken out of production due to the ringspot virus, new acreage is being planted in uninfested areas. New trees will be ready for their first harvest about 8 months after planting.

Lower fresh production boosted grower prices 3 percent to 44.8 cents per pound in 1996. The fresh price increase, however, was not enough to offset the smaller crop, lowering the year's value of production 8 percent from 1995 to $17.1 million. Hawaii's production accounted for 23 percent of the U.S. fresh papaya supply in 1996, down from 36 percent in 1995.

Papaya production appears to continue to decline, falling 5 percent from January through June 1997 over the same period last year. As might be expected, the lower production has brought higher grower prices, averaging 52.4 cents a pound from January through April, up 11 percent from 1996. Despite lower domestic production, fresh papaya imports have fallen 5 percent from January through May this year.

Fresh Pineapple Consumption Down, Processed Stable in 1996

U.S. consumption of fresh pineapple fell slightly in 1996 as it has for the previous 2 years. While imports set a record at 298.2 million pounds, they were not sufficient to offset declining domestic production and increasing exports. Costa Rica supplies about 63 percent of imported fresh pineapples to the United States (table 22). Honduras and Mexico are also important suppliers. The Dominican Republic's share of the market has been declining over the past few years, although the country continues to be a major source of fresh pineapples.

Table 22--U.S. Imports of fresh and frozen pineapples, by country, 1992-96

Country	1992	1993	1994	1995	1996
	1,000 pounds				
Costa Rica	129,103	161,718	185,351	172,997	192,303
Honduras	69,344	58,857	63,978	73,379	60,129
Mexico	14,855	17,150	13,148	13,598	17,851
Dominican Republic	55,570	38,610	23,393	7,491	9,105
Ecuador	0	0	289	3,239	8,942
Thailand	4,266	5,977	6,777	4,001	6,182
Panama	0	57	298	93	5,628
El Salvador	0	0	159	1,448	3,627
Guatemala	849	681	750	1,204	877
Indonesia	82	518	419	0	161
Other countries	483	1,179	31	1,340	304
World	274,550	284,747	294,593	278,790	305,109

Source: Bureau of the Census, U.S. Department of Commerce.

Processed pineapple consumption, both juice and canned, remained almost stable in 1996. Hawaiian pineapples going to processing increased 5 percent from 1995. Imports of pineapple juice, however, declined about 1 percent and canned increased less than 1 percent from a year earlier, contributing to the level consumption. Imports represented about 80 percent of the supply of pineapple juice and 88 percent of canned in 1996. The Philippines, Thailand, and Indonesia continue to be the major suppliers of both juice and canned pineapple to the U.S. market (tables 23 and 24). These countries contributed 86 percent of canned imports and 89 percent of juice imports. The Philippines alone accounted for 42 percent of canned pineapple imports and 44 percent of pineapple juice imports in 1996.

Table 23--U.S. Imports of canned pineapple, 1992-96

Country	1992	1993	1994	1995	1996
	1,000 pounds				
Philippines	282,599	283,219	284,617	274,705	276,572
Thailand	384,953	379,243	339,953	219,505	172,069
Indonesia	36,299	42,091	53,815	61,584	120,862
Japan	15,159	29,262	27,421	52,232	33,887
Malaysia	5,049	5,529	11,742	18,342	18,043
Republic of So. Africa	9	1,343	4,017	12,509	14,229
Mexico	13,065	8,247	4,969	3,942	5,767
Vietnam	0	0	0	355	5,478
China	2,026	970	666	1,052	3,907
Singapore	5,470	6,773	5,198	2,050	3,777
Other countries	16,927	5,258	7,752	8,700	5,227
World	761,556	761,935	740,149	654,976	659,817

Source: Bureau of the Census, U.S. Department of Commerce.

Table 24--U.S. imports of pineapple juice, 1992-96

Country	1992	1993	1994	1995	1996
	Thousand single-strength gallons				
Philippines	41,461	37,689	36,795	43,716	36,805
Thailand	35,363	41,768	27,121	30,439	31,130
Indonesia	288	871	3,423	3,951	6,771
Dominican Republic	1,230	1,437	729	141	2,358
Japan	3,417	2,536	2,500	3,529	2,299
Costa Rica	1,973	2,859	1,874	1,780	1,704
Honduras	1,142	984	112	48	970
Mexico	1,230	220	94	523	640
Rep. of So. Africa	209	327	372	315	475
Hong Kong	30	43	27	230	234
Other countries	1,551	267	166	343	456
World	87,895	89,001	73,213	85,016	83,843

Source: Bureau of the Census, U.S. Department of Commerce.

Hawaii's pineapple production rose to 694 million pounds in 1996, up 1 percent from 1995. This was the first increase in 4 years. Most of the increase went to processed production; fresh use fell 8 percent. With fresh production at its lowest level in at least 5 years, shipments out of Hawaii fell to 190.1 million pounds.

Higher production and increased season-average grower prices for both fresh and processing pineapples boosted the value of the 1996 crop to $95.9 million. Lower production of fresh pineapples raised prices 20 percent. Processing pineapples also brought higher prices, up 3 percent from last year.

Citrus Fruit Outlook

U.S. Citrus Crop Expected Up Again in 1996/97

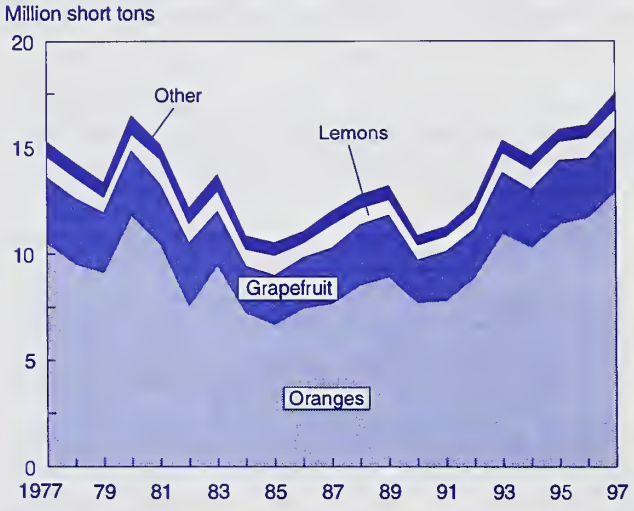
U.S. citrus production is expected to increase again in 1996/97, as it has for the past 4 years (table 25). Most of the increase can be attributed to record production of Florida oranges and a large U.S. grapefruit crop. All citrus-producing States appear to have production gains this year, except Arizona, which continues to remove acreage from production.

California's orange and grapefruit production is expected to increase in 1996/97, but lemons fell short of last year's crop. Lemons also matured earlier than a year ago, potentially leading to a tighter market this summer. Retail prices for lemons averaged $1.16 per pound during August 1996-June 1997, 4 percent above the last 2 years. Picking of the 1997/98 lemon crop was expected to begin in mid-August in Arizona and the California Desert district. Crop size for 1997/98 is expected to be similar to the 1996/97 crop.

Texas continues to show growth in its citrus production, which remains small relative to Florida and California. Texas' share of the grapefruit market has grown from 5 percent in 1993/94 to 7 percent in 1996/97.

All Florida citrus crops are forecast to increase. Orange production is projected to grow 11 percent and grapefruit production 7 percent over a year earlier. Tangerine production grew 42 percent from a year ago, with production increasing the most for early varieties such as Fallglo and Sunburst. Lime production continues to increase after groves were destroyed by Hurricane Andrew in 1992. This year, 2.8 million pounds of limes were produced in Florida, up 7 percent from 1995/96. Production for 1997/98 is forecast to increase again to 3.3 million pounds.

Figure 17
U.S. Citrus Production



Year harvest was completed.

Table 25--U.S. Citrus fruit: Utilized production by crop and state, 1993/94-1996/97 1/

Crop and State	1993/94	1994/95	1995/96	1996/97	1993/94	1994/95	1995/96	1996/97
	-- 1,000 boxes 2/ --				-- 1,000 short tons --			
All oranges	240,450	263,605	271,790	299,120	10,329	11,432	11,723	12,918
Arizona	1,900	1,050	1,650	1,000	71	39	63	38
California	63,600	56,000	66,000	71,000	2,385	2,101	2,477	2,663
Florida	174,400	205,500	203,200	225,700	7,849	9,248	9,144	10,157
Texas	550	1,055	940	1,420	24	44	39	60
All grapefruit	65,100	71,050	66,200	71,400	2,661	2,912	2,718	2,931
Arizona	1,750	1,400	1,200	900	59	47	40	30
California	9,300	9,300	8,100	9,200	311	312	271	308
Florida	51,050	55,700	52,350	56,000	2,171	2,367	2,225	2,381
Texas	3,000	4,650	4,550	5,300	120	186	182	212
All lemons	25,900	23,600	26,100	24,600	984	897	992	935
Arizona	5,200	3,600	5,100	2,600	197	137	194	99
California	20,700	20,000	21,000	22,000	787	760	798	836
Limes:								
Florida	200	230	300	320	9	10	13	14
Tangelos:								
Florida	3,350	3,150	2,450	3,950	150	142	110	178
All tangerines	7,400	6,700	8,100	9,850	318	287	348	434
Arizona	1,000	650	1,000	550	37	25	38	21
California	2,300	2,500	2,600	2,900	86	94	97	109
Florida	4,100	3,550	4,500	6,400	195	168	213	304
Temples:								
Florida	2,250	2,550	2,150	2,400	101	114	97	108
K-early citrus:								
Florida	210	120	160	150	9	5	7	7
U.S. total citrus	--	--	--	--	14,561	15,799	16,008	17,525

-- = Not applicable.

1/ The crop year begins with bloom of the first year shown and ends with harvest.

2/ Net pounds per box: oranges-California and Arizona-75; Florida-90; Texas-85; grapefruit-California and Arizona-67; Florida-85; Texas-80; lemons-76; limes-88; tangerines-California and Arizona-75; Florida-95; tangelos, Temples, and K-early-90.

Source: National Agricultural Statistics Service, USDA.

Record Orange Crop Forecast for 1996/97

The U.S. orange crop is forecast at a record 12.9 million tons in 1996/97, surpassing the previous record in 1979/80 by 9 percent (table 26). An expected 11-percent rise in Florida's crop from a year earlier accounts for most of the increase, but production is expected to rise in California and Texas as well. California's navel and Valencia output is forecast to increase almost 8 percent in 1996/97, almost all of which will be sold in the fresh market. Arizona's orange production continues to decline, and is projected to fall almost 40 percent. Fresh-market orange grower prices in California averaged $8.72 per 75-lb box from November 1996 to May 1997, down less than 1 percent from the previous year.

Winter rains in December and January delayed harvesting and gave the fruit time to size. This year's navels were reported to be of very good quality and large sized, supporting prices even though there was a large quantity of fresh oranges in the market. The Valencia harvest was half completed by mid-June. The fruit quality is reported good, which should help maintain prices. Heavy competition from large stonefruit and grape crops this summer, however, may weaken summer demand for Valencias, preventing prices from increasing above a year ago. Much of the early Valencia harvest is exported because of the large variety and volume of other fruit in the summer market. Early summer exports also meet the market window in Japan before its citrus enters the market. Industry analysts say that California's and Arizona's 1997/98 navel crop is of good quality, but maybe slightly smaller than in 1996/97. The 1997/98 Valencia crop is already set on the trees, and while the 1996/97 crop also is still on the trees, the coming year's crop is said to be producing good-sized fruit and is expected to be similar in volume to this year.

Table 26--U.S. Oranges: Supply and utilization, 1986/87-1996/97

	Supply		Utilization		
Season 1/	Production	Fresh imports	Processed	Fresh exports	Fresh consumption
			1,000 short tons		
1986/87	7,889	22	5,731	584	1,596
1987/88	8,712	25	6,569	465	1,703
1988/89	9,117	9	7,062	559	1,505
1989/90	7,873	13	5,763	576	1,547
1990/91	7,961	69	6,704	257	1,068
1991/92	9,015	17	6,837	546	1,649
1992/93	11,105	11	8,664	613	1,839
1993/94	10,329	18	8,075	604	1,668
1994/95	11,432	20	9,241	635	1,576
1995/96	11,723	25	9,317	560	1,871
1996/97f	12,918	22	10,076	617	2,247

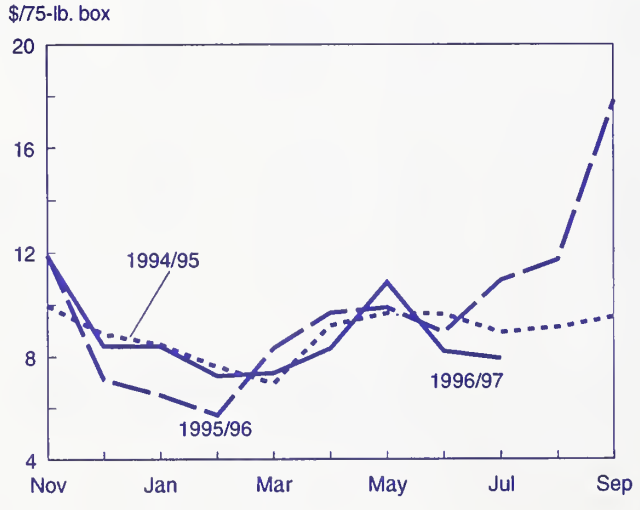
f=forecast.

1/ Marketing season begins in November of the first year shown. Includes Temples before 1993/94.

Source: Economic Research Service and Foreign Agricultural Service, USDA.

Figure 18

Fresh-Market Orange Prices in California



Equivalent-on-tree prices received by growers.

Despite the strong American dollar, the high quality of this year's fruit helped boost exports 12 percent above last year during November-May. Exports rose to Canada and Hong Kong, but fell to Japan. Fresh orange imports also rose in 1995/96 (table 26). Although only a small portion of domestic supply, shipments have been growing in the past few years from Australia and South Africa, mostly in the summer months.

Abundant Florida Orange Crop Deflates Growers' Returns

The forecast record orange crop in Florida has generated an expected large supply of orange juice for 1996/97 (table 27). Florida harvested 225.7 million 90-pound boxes, 134.2 million boxes of early and midseason oranges and an esti-

Table 27--United States: Orange juice supply and utilization, 1986/87-1996/97

Season 1/	Beginning stocks 2/	Production	Imports	Exports	Domestic consumption	Ending stocks 2/
			-- Million SSE gallons 3/--			
1986/87	204	781	557	73	1,267	201
1987/88	201	907	416	90	1,223	212
1988/89	212	970	383	73	1,258	233
1989/90	233	652	492	90	1,062	225
1990/91	225	876	327	96	1,174	158
1991/92	158	930	286	108	1,097	170
1992/93	170	1,207	326	114	1,339	249
1993/94	249	1,133	403	106	1,319	360
1994/95	360	1,257	198	117	1,415	283
1995/96	283	1,283	261	130	1,399	298
1996/97f	298	1,456	232	162	1,442	382

f=forecast.

1/ Season begins in December of the first year shown.

2/ Data may not add due to rounding. Beginning with 1994/95 ending stocks, stock data includes chilled as well as canned and frozen concentrate juice.

3/ SSE = single-strength equivalent.

Source: Economic Research Service and Foreign Agricultural Service, USDA.

Table 28--Monthly prices for processed oranges and frozen concentrated orange juice, 1994/95-1996/97

Month	Processed orange 1/			Near-term futures contract 2/			Retail frozen concentrate 3/		
	1994/95	1995/96	1996/97	1994/95	1995/96	1996/97	1994/95	1995/96	1996/97
	--Dollars/90-lb. box--			--Dollars/lb. solids--			--Dollars/16 fl. oz. of product--		
December	2.95	3.15	3.25	1.094	1.240	0.887	1.549	1.573	1.735
January	3.05	3.80	3.50	1.048	1.179	0.825	1.583	1.577	1.737
February	3.15	4.60	3.31	1.032	1.242	0.804	1.609	1.625	1.768
March	4.16	5.20	3.00	1.016	1.328	0.837	1.629	1.609	1.747
April	4.32	6.20	4.40	1.058	1.320	0.751	1.632	1.657	1.727
May	4.40	6.60	4.20	1.046	1.232	0.787	1.632	1.704	1.736
June	4.33	7.05	4.15	1.012	1.222	0.749	1.620	1.743	1.752
July	--	--	--	0.936	1.165	0.749	1.639	1.774	1.770
August	--	--		1.084	1.172		1.642	1.765	
September	--	--		1.122	1.101		1.607	1.733	
October	--	1.40		1.162	1.115		1.583	1.761	
November	2.70	3.15		1.226	1.016		1.550	1.747	
Simple average	3.63	4.57		1.070	1.194		1.608	1.641	

-- = Not available.

1/ Equivalent on-tree price received by growers, Florida. One box contained 6.52 pounds of orange juice solids in 1993/94, 6.22 in 1994/95, and 6.33 in 1995/96.

2/ Average of Friday closing prices. 3/ 16 fluid ounces of 42 degrees Brix product contain 0.52 pounds of orange juice solids.

Sources: National Agricultural Statistics Service, USDA; New York Cotton Exchange; Bureau of Labor Statistics, U.S. Department of Labor.

mated 91.5 million boxes of Valencias. The 1996/97 crop, if realized, would be the largest on record. Because of the large crop, prices received by growers fell this year, averaging $3.69 during December-June, 29 percent lower than a year earlier and 18 percent below the previous 2-year average (table 28).

Along with record fruit production, juice yield estimates are also up this year at 1.58 gallons per box, 4 percent higher than last year. The increased production and yields raise frozen concentrated orange juice (FCOJ) production estimates to 1.456 billion single-strength gallons, 13 percent above last year and the third year of production increases. While FCOJ consumption is projected to rise 3 percent this year to 1.442 billion single-strength gallons, it is not growing fast enough to keep up with production. Therefore, stocks at the end of the year are expected to reach 382 million gallons, more than a year's supply.

The large FCOJ production has brought down futures prices, which ranged from $0.751 to $0.887 per pound solids between December and June, 36 percent below last year. Retail prices generally increase or decline along with futures prices after a several week lag. However, this has not been the case this year. While both futures and growers' prices have been down throughout the 1996/97 marketing year, orange juice retail prices have remained about 6 percent above a year ago, ranging from $1.727 to $1.768 for 16 fluid ounces.

Orange juice exports during December 1996 to May 1997 rose 40 percent from the previous year. Exports to the European Union, which accounted for 36 percent of the U.S. orange juice export market, rose 53 percent. Exports to Japan, which accounted for 9 percent of exports, fell 8 percent. The large supply of orange juice on the world market due to large crops in the United States and Brazil, have lowered the world price, and the value of U.S. exports in 1996/97 rose 12 percent from a year ago. U.S. orange juice exports in 1996/97 are forecast at a record 162 million gallons single strength based on the strong shipments to date.

The quantity of imported orange juice from December through May also was up in 1996/97. Most of the increase in imports, however, can be attributed to the early months of the season when imported juice is used for blending. While imports have continued to enter the United States throughout the season, April and May saw lower quantities arriving than last year in response to the large domestic supply.

USDA forecasts Brazil's FCOJ production in 1997 to be up 10 percent from 1996 and exports to rise 1 percent (table 29). Tighter stocks coming into this year have moderated supplies despite the high level of production, slowing export increases. Exports rose 8 percent in 1996 due to large beginning stocks and production. The European Union continues to be the major market for Brazilian orange juice. Expected large supplies in both Brazil and the United States in the coming year should put downward pressure on world FCOJ prices.

Table 29--Brazilian FCOJ production and utilization, 1991-97

Season 1/	Beginning stocks	Production	Domestic consumption	Exports	Ending stocks
	--Million SSE gallons 2/--				
1991	177	1,334	25	1,390	96
1992	96	1,610	25	1,532	148
1993	148	1,572	25	1,546	148
1994	148	1,583	31	1,482	218
1995	218	1,525	27	1,476	240
1996	242	1,603	28	1,603	214
1997f	214	1,757	28	1,631	312

f=forecast

1/ Season begins in July of year shown.

2/ SSE=single-strength equivalent. To convert to metric tons at 65-degree Brix, divide by 1.40588.

Source: Foreign Agricultural Service, USDA.

Grapefruit Production Increases in 1996/97

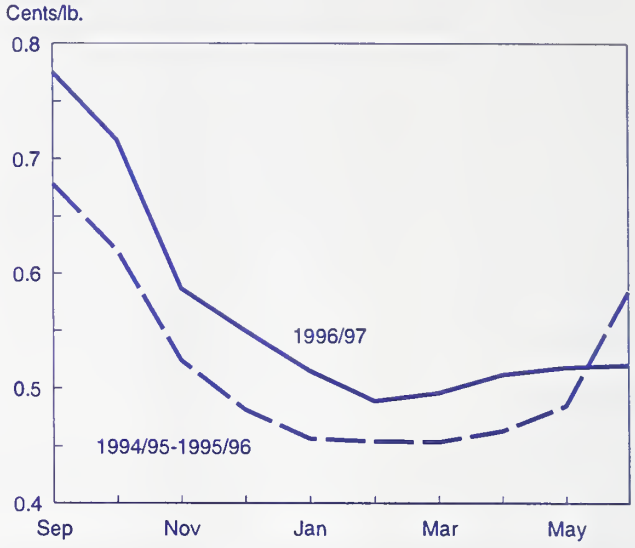
The utilized grapefruit crop is expected to reach 2.9 million short tons, 8 percent above 1995/96, but less than 1 percent above the 1994/95 crop. Production is up in Florida, California, and Texas, but down in Arizona. The July forecast is 4 percent below initial estimates for the year, as about 127,500 tons of Florida's grapefruit remain unharvested in 1996/97. Leaving grapefruit unharvested could reduce Florida's crop next year, which is presently expected to be about 2.3 million tons. California's crop is forecast about 2 percent higher than the initial forecast in October, and harvesting began in May. Most of the early harvest has been going to export markets because of the large supply of stonefruit and grapes in the domestic market.

Grower prices for fresh-market grapefruit in Florida averaged about 4 percent lower from October through May than the previous year (table 30). Prices were pushed down by the large supply of grapefruit, weak demand partly due to the smaller size of this year's fruit compared to the previous 2 years, and large supplies of fresh oranges and imported fruit.

Fresh grapefruit consumption is expected to increase 1 percent from a year ago, but drop 3 percent lower than the 3 previous years (table 31). Retail prices are averaging 6 percent above last year and 12 percent above 1994/95, ranging from $0.496 to $0.775 per pound. High retail prices for fresh grapefruit, a late start in Florida's grapefruit season, strong competition from other winter and spring fruit, and more grapefruit going to processing instead of the fresh market all contribute to the slower growth in fresh grapefruit consumption this year.

Fresh grapefruit exports fell 4 percent from September through May 1996/97 from a year earlier. Exports fell 10 percent to Japan, which accounted for 45 percent of the export market in 1996/97. Exports to the European Union fell 2 percent during this time, but exports to the United Kingdom and Germany rose. Some industry analysts believe that during large crop years, importers are more selective about the quality of the fruit they purchase, which can have an adverse effect on overall sales. The strong U.S. dollar in Europe and Japan, the small size of Florida's grapefruit,

Figure 19
U.S. Average Retail Prices for Grapefruit



and increased demand for top-quality fruit have kept overseas demand down. In 1996/97, grapefruit exports accounted for 42 percent of fresh supply.

Florida has had an infestation of the Mediterranean fruit fly (medfly) in five counties. The medfly uses over 250 varieties of fruit and vegetables as hosts. For citrus, the greatest threat is to the grapefruit crop, because it is the major fresh citrus export from Florida. Because the infestation was discovered during the summer, it is not expected to adversely affect grapefruit exports in 1997/98. The infestation has occurred during a time when it would least affect production and has not affected the Indian River area which produces much of the grapefruit for export. The fly only uses ripe and near-ripe fruit as a host, and Florida's citrus will not begin to ripen until the fall. Florida is vigorously combating the medfly and expects to have the situation under control by the time the fruit is ripened and ready for marketing.

An estimated 1.6 million short tons of grapefruit went into processing this year, the second largest amount in at least 10 years. Grapefruit juice yields are also up this year, at 1.20 gallons per box (40-degree Brix). The larger propor-

Table 30--Grapefruit: Average monthly equivalent on-tree prices received by growers, Florida, 1993/94-1996/97

Month	Fresh grapefruit				Processing grapefruit				All grapefruit			
	1993/94	1994/95	1995/96	1996/97	1993/94	1994/95	1995/96	1996/97	1993/94	1994/95	1995/96	1996/97
	--Dollars/ 85--lb. box--											
September	--	8.65	--	--	--	-1.31	--	--	--	7.33	--	--
October	9.47	6.89	7.40	10.66	0.22	-0.91	-1.55	-2.36	7.55	4.66	5.41	8.40
November	6.20	3.69	4.52	3.96	0.93	-0.22	-2.05	-2.12	4.81	2.25	2.42	2.28
December	5.17	3.38	3.54	3.86	1.17	0.08	-1.46	-2.01	3.72	1.84	1.33	1.91
January	4.99	4.39	4.24	4.88	1.64	0.38	-0.61	-1.44	3.44	2.07	1.68	1.81
February	5.16	4.69	4.66	5.07	1.71	0.57	-0.05	-1.07	3.12	1.81	1.70	2.23
March	5.68	4.23	4.70	3.11	1.63	0.54	0.00	-0.56	2.87	1.52	1.44	0.28
April	4.95	3.38	5.88	4.36	1.62	0.13	0.07	-0.93	2.65	1.21	2.13	0.59
May	1.99	2.75	5.22	2.81	0.99	-0.13	-0.29	-1.60	1.35	1.14	2.47	-0.25
June	2.10	--	--	3.10	0.35	--	--	-1.90	1.41	--	--	2.27

-- = Insufficient marketing to establish price.

Sources: National Agricultural Statistics Service, USDA.

Table 31--U.S. Grapefruit: Supply and utilization, 1985/86-1996/97

Season 1/	Supply: Production	Supply: Fresh imports	Utilization: Processed	Utilization: Fresh exports	Utilization: Fresh consumption
	1,000 short tons				
1985/86	2,352	3	1,264	353	738
1986/87	2,586	2	1,386	436	766
1987/88	2,801	6	1,469	523	815
1988/89	2,844	4	1,449	587	812
1989/90	1,978	5	1,096	337	550
1990/91	2,256	8	1,015	513	736
1991/92	2,224	12	975	506	755
1992/93	2,791	14	1,518	486	801
1993/94	2,661	16	1,377	506	794
1994/95	2,912	14	1,587	536	793
1995/96	2,718	14	1,413	553	766
1996/97f	2,931	7	1,583	584	771

f=forecast.

1/ Marketing season begins in September of the first year shown.

Source: Economic Research Service and Foreign Agricultural Service, USDA.

tion of fruit going to processing, and higher juice yields should boost grapefruit juice supply over last year. Florida juice processors packed 30 million 40-degree Brix gallons of concentrated grapefruit juice this year, up 12 percent from 1995/96, but 4 percent below 1994/95. While production is high, juice movement has been slower than the previous 2 years, raising grapefruit stocks 17 percent from last year. White grapefruit juice accounted for about 70 percent of stocks at the end of July, and red grapefruit juice accounted for the remainder. According to industry sources, white grapefruit juice is moving more slowly this year than the red.

Higher juice stocks and decreased demand for grapefruit by-products such as feed, oil, and essence, have put downward pressure on grower prices in Florida for processing grapefruit. The on-tree equivalent price received by growers for 1996/97 averaged minus $1.554 per 85-pound box. Prices this year were the lowest in the nineties, ranging from minus $0.56 to minus $2.36. With another large crop expected in 1997/98 and the present slow movement of stocks, grower prices for processing grapefruit can be expected to be low again in 1997/98.

Tree Nut Outlook

Almond, Walnut Production Increase, Other Nut Crops Also Appear Higher

Generally normal weather in California portends good crops in the West. Crop development in California is ahead of normal. Southwest and southeastern pecan orchards have experienced variable conditions, but crop conditions appear good.

Almond Supply Second Highest

California expects 680 million pounds (shelled basis) of almonds to be harvested this year, 33 percent higher than last season's crop. Although the July forecast was 4 percent lower than the May forecast, production is expected to be the second only to the record 1994 crop of 735 million pounds. The crop has a bearing acreage of 420,000 acres, up from 405,000 acres in 1996. The crop is 1 to 2 weeks ahead of normal. There has been some concern about bud failure, which is a genetic susceptibility of some varieties to high heat. Some orchards in the central and southern San Joaquin Valley were subjected to high heat last summer, affecting this year's bud development.

Production of Nonpareil, the major almond variety, is forecast at 333 million pounds, up 33 percent from last season. The average nut set for all varieties is 7,567 almonds per tree, up 38 percent from 1996. The Nonpareil nut set, at 7,714, is 55 percent above last year. The average kernel weight for all varieties, at 1.59 grams, is down 14 percent from last year. The percent of sound nuts is 97.9, indicating excellent quality and only minor insect and other off-grade problems.

Stocks at the end of the 1996/97 marketing year (June 30) totaled 66.6 million pounds, among the lowest in recent years. Domestic almond demand declined last year to 128 million pounds or .48 pounds per capita (table 32). The season-average grower price was $2.06 per pound, compared with 1995's record high of $2.48.

The strong export demand situation during the 1996/97 season led to reduced available supply for domestic markets and caused ending stocks to fall sharply to the lowest level since 1978/79. With the much improved supply situation for the 1997/98 marketing season, exports are expected to increase dramatically, and domestic consumption should also rise. Even though prices are likely to decline due to the larger supply, grower cash receipts should likely exceed the $1 billion reached last season.

Walnut Production Up Sharply

California walnut production is forecast at 230,000 tons, in-shell basis, 11 percent higher than the 1996 crop, but slightly below 1995. Bearing acreage in 1997 is estimated at 170,000 acres, up slightly from last year. The production increase is mainly due to a much higher expected yield for the Hartley variety. Also, lower blight and less droppage this year should result in a cleaner crop and higher quality. An updated production forecast by the California Agricultural Statistics Service, based upon an objective measurement survey, will be available on September 5, 1997.

Total supply for the 1997/98 marketing year should be higher than last season even with smaller beginning stocks, but likely lower than in the 1993, 1994, or 1995 crop years. In-shell shipments between August 1, 1996, and June 30, 1997, reached 139 million pounds, up 2 percent from a year earlier. Shelled shipments totaled 122 million pounds through June 30, 1997, compared with 140 million pounds the previous year. Total domestic shipments through June 30 exceeded 120,000 tons (in-shell equivalent), down 17 percent from last season, while export shipments totaled more than 93,000 tons, up 4 percent. Shipments to the major European markets such as Germany, Italy, Spain, and the Netherlands were higher, but shipments to other European markets were lower. Shipments were higher as well to Canada, the Middle East, and South America, but lower to Pacific Rim markets during the 1996/97 season. The primary reason is ever-increasing competition from China. However, the long-term trend in domestic demand for U.S. walnuts continues to hold relatively steady.

The grower price averaged $1,550 per ton during the 1996/97 season, compared with $1,400 the previous year, and $1,030 in 1994/95, a crop year plagued with quality problems. Prices for the 1997/98 marketing year should remain good as crop quality is expected to be excellent.

Large Hazelnut Output Expected

The Oregon hazelnut crop this year is expected to be much larger than in 1996 and similar to the 1995 crop. Last year's crop yield was below average due to the alternate-bearing nature of this tree nut, but there were also some weather-related problems that affected yield and quality. Bearing acres continue to increase. The preliminary industry estimate places 1997 production at 35,000 tons, in-shell basis, due to excellent bloom and crop development conditions. Minor problems with brown-stain have been reported. The official USDA forecast based upon an objective measurement survey will be available on August 26, 1997.

The 1996 U.S. hazelnut crop was produced in an "off-year" with output totaling only 19,000 tons (in-shell basis), compared with the large crop of 39,000 tons in 1995. Nearly all U.S. hazelnut production occurs in Oregon. The grower price for the 1996/97 marketing year averaged $859 per ton. In spite of a large supply during the 1995/96 season, the grower price averaged $913 per ton, the highest since 1987 due to strong domestic demand. Carryover stocks for the 1997/98 marketing year that began July 1 were seasonally low and will have little impact on the available supply. Therefore, prices are expected to continue very strong. Hazelnuts may face more competition in international markets as production in Turkey may rebound this year, but this development may be offset somewhat by a smaller expected crop in Italy.

Pecan Crop Prospects Higher

Most pecan-producing States expect output to rise this year. Early industry estimates place the crop at 275-300 million pounds, in-shell basis. The first official forecast will be issued by USDA on September 12, 1997. Last year's produc-

tion totaled 222 million pounds (in-shell basis), compared with an average crop of 268 million in 1995, and a small crop of 199 million pounds in 1994. The second-largest crop on record of 365 million pounds was produced in 1993. The pecan crops this year are up substantially in New Mexico, Oklahoma, and Texas. Other States that appear to have much better crops include Florida, and Mississippi. Alabama was expecting a very good crop, but the effects of recent storm damage caused by Hurricane Danny are unknown at this time. Some estimates indicate that as much as 70 percent of Alabama's crop may have received damage. Alabama typically accounts for about 6 percent of U.S. pecan production. Georgia, the largest producing State, also anticipates a good crop. States that are likely to have lower production include Arizona and Louisiana.

The U.S. grower price for all pecans was very weak last year, averaging 63.7 cents per pound for the entire season, compared with $1.01 for the 1995 crop and $1.04 in 1994. Considerable quality problems characterized last year's crop, especially in Texas and Oklahoma, where drought and heat caused nut kernels to shrivel and darken in color. Beginning stocks for the 1997/98 season (July 1-June 30) at 60 million pounds, are well below a year ago.

Pecan exports and imports are holding steady, but in the 1990's growth of imports outpaced exports making the United States a net importer. Nearly all pecan imports are from Mexico, and the quantity imported varies from year to year depending on the U.S. supply situation. Typically, imports account for 10-20 percent of the total supply. The industry reports that Mexico could add substantially to the supply in future years. Recent estimates are that Mexico planted 107,570 acres of irrigated pecans in various stages of maturity. Mexico's production in 1996/97 is estimated at 44,600 metric tons, in-shell basis, compared with 41,569 tons in 1995/96 and 31,750 in 1994/95, according to figures from the International Tree Nut Council. There are no forecasts available for the 1997/98 crop. Mexico may eventually produce as many pecans as Georgia and Texas combined, or approximately two-thirds of total U.S. production.

Pistachio Industry Expects Record Crop

The California pistachio industry is anticipating a record crop of 170 million pounds, in-shell basis, compared with the existing record of 152 million pounds harvested in 1993. An excellent crop and yield is expected on increased acreage. Results of a USDA objective measurement survey and a production forecast will be released on August 29, 1997, showing nut set and other yield factors. Pistachios, like walnuts, bloom later than many other fruit and nut crops and appear to have done well during the spring bloom. However, pistachios are more alternate-bearing than walnuts, and more similar biologically to almonds, bearing heavy one year and then bearing lighter the next. In 1996, California pistachio production dropped to 105 million pounds, in-shell basis. This performance compares with 148 million pounds in 1995 and 129 million in 1994. Bearing acreage was 64,300 in 1996 compared with 60,300 in 1995 and 57,500 acres in 1994. Bearing acres should be higher in 1997 as acreage continues to trend upward.

The grower price last season averaged $1.16 per pound, in-shell basis, compared to $1.09 per pound in 1995 and 92.1 cents in 1994. The in-shell pistachio inventory was 22.8 million pounds on June 30, 1997, nearly the same as on June 30, 1996. Shelling stock this June stood at 2.0 million pounds, compared with 6.2 million a year ago. Domestic in-shell shipments totaled 51.4 million pounds (September 1-June 30) this year compared with 59.9 million a year earlier. The export in-shell shipments for the same period during the 1996/97 season, at 27.2 million pounds, were also lower compared with 1995/96 at 34.6 million pounds. Major export markets include Eastern Europe, Australia, Hong Kong, Korea, Japan, Switzerland, and Canada. This should be a banner year for California pistachios in domestic and international markets. Iran, the world's largest producer, experienced a freeze during the bloom period and expects below normal production. This event should allow the United States to export a higher volume than usual.

Record Macadamia Nut Crop

Although the 1996 acreage of Hawaii macadamia nuts slipped to 19,200 acres, production increased to a record 56.5 million pounds, in-shell basis. Output of macadamia nuts continues to trend upward primarily due to increasing numbers of bearing trees. If acreage remains static, production could continue to increase if yields trend upward. Grower prices improved in 1996, averaging 78 cents per pound, compared with 74 cents in 1995 and 69 cents in 1994.

Table 32--Tree nuts: Supply, utilization and grower prices, by commodity and marketing year, 1992/93-1996/97

Commodity	Marketing year 1/	Beginning stocks	Marketable production 2/	Imports	Total supply	Exports	Ending stocks	Domestic consumption		Grower price
								Total	Per capita	
		--Million pounds (shelled)--							Pounds	$/lb.
Almonds 3/	1992/93	148.1	516.0	0.3	664.4	349.9	128.2	186.3	0.72	1.30
	1993/94	131.1	470.1	0.3	601.5	336.5	102.6	162.3	0.63	1.94
	1994/95	102.6	713.1	0.4	816.1	448.1	204.8	163.2	0.62	1.34
	1995/96	204.8	351.4	0.7	556.9	331.3	92.8	132.8	0.50	2.48
	1996/97 P	92.8	486.7	0.7	580.2	385.7	66.6	127.9	0.48	2.06
Hazelnuts 4/	1992/93	3.0	21.1	8.8	32.9	9.3	3.0	20.6	0.08	0.69
	1993/94	3.0	31.0	7.8	41.8	14.4	1.7	25.7	0.10	0.80
	1994/95	1.7	15.8	12.3	29.8	10.4	0.4	18.9	0.07	1.04
	1995/96	0.4	29.9	9.7	40.0	9.7	1.6	28.7	0.11	1.14
	1996/97 P	1.6	14.0	9.5	25.1	8.7	0.4	16.0	0.06	1.07
Pecans	1992/93	49.6	74.1	30.3	154.0	16.5	48.2	89.3	0.35	3.24
	1993/94	48.2	156.9	23.9	229.0	15.2	76.7	137.1	0.53	1.36
	1994/95	76.7	86.2	32.6	195.6	13.5	55.0	127.1	0.49	2.40
	1995/96	55.0	122.4	27.2	204.6	16.0	85.9	102.7	0.39	2.35
	1996/97 P	85.9	99.0	28.4	213.3	15.9	59.7	137.7	0.52	1.43
Walnuts 5/	1992/93	55.7	168.1	8.0	231.8	75.0	37.2	119.6	0.47	1.69
	1993/94	37.2	216.1	1.2	254.4	83.3	72.7	98.4	0.38	1.67
	1994/95	72.7	199.9	0.7	273.3	99.6	56.9	116.8	0.45	1.16
	1995/96	56.9	196.9	0.8	254.7	83.8	54.2	116.7	0.44	1.61
	1996/97 P	54.2	174.8	0.8	229.8	84.0	36.0	109.8	0.41	1.84
Macadamias	1992/93	na	10.3	4.4	14.7	2.1	na	12.7	0.05	3.16
	1993/94	na	11.2	4.1	15.3	1.4	na	13.9	0.05	2.94
	1994/95	na	12.0	4.7	16.7	1.5	na	15.2	0.06	3.02
	1995/96	na	11.5	4.7	16.2	1.4	na	14.8	0.06	3.29
	1996/97 P	na	12.9	4.6	17.5	1.7	na	15.8	0.06	3.42
Pistachios 6/	1992/93	6.1	65.4	0.4	71.8	27.8	17.6	26.5	0.10	2.31
	1993/94	17.6	61.9	0.5	80.0	21.1	25.7	33.3	0.13	2.61
	1994/95	25.7	51.2	0.7	77.7	25.3	16.8	35.6	0.14	2.31
	1995/96	16.8	53.8	0.5	71.1	19.7	18.1	33.4	0.13	2.40
	1996/97 P	18.1	40.4	0.4	58.9	10.0	15.0	33.9	0.13	3.01
Other nuts 7/	1992/93	na	0.0	175.8	175.8	27.4	na	148.4	0.58	--
	1993/94	na	0.0	176.7	176.7	32.4	na	144.3	0.56	--
	1994/95	na	0.0	167.5	167.5	36.5	na	131.0	0.50	--
	1995/96	na	0.0	162.4	162.4	35.0	na	127.4	0.48	--
	1996/97 P	na	0.0	166.8	166.8	39.9	na	126.9	0.48	--
Total	1992/93	262.5	855.0	228.1	1,345.5	508.1	234.1	603.4	2.35	--
	1993/94	237.0	947.1	214.6	1,398.7	504.2	279.4	615.1	2.37	--
	1994/95	279.4	1,078.3	218.9	1,576.7	634.8	334.0	607.8	2.32	--
	1995/96	334.0	765.8	206.1	1,305.9	496.8	252.6	556.5	2.11	--
	1996/97 P	252.6	827.8	211.2	1,291.6	545.9	177.7	568.0	2.13	--

na: Not available. -- = Does not apply. P = Preliminary.

1/ Marketing season begins July 1 for almonds, hazelnuts, macadamias, pecans, and other nuts; August 1 for walnuts; and September 1 for pistachios. 2/ Utilized production minus inedibles and noncommercial use. 3/ Stock figures from the Almond Board of California. 4/ Stock figures from the Hazelnut Marketing Board. 5/ Stock figures from the Walnut Marketing Board. 6/ Stock figures from the California Pistachio Commission. 7/ Includes Brazil nuts, cashew nuts, pine nuts, chestnuts, and mixed nuts.

Source: Economic Research Service and National Agricultural Statistical Service (utilized production and stock data, except where noted), USDA; and Bureau of the Census, U.S. Department of Commerce (trade data).

United States Is World Leader in Tree Nut Production and Trade

by
Doyle C. Johnson[1]

Abstract: Crops of all major U.S. tree nuts will be larger in 1997. However, beginning stocks of most tree nuts are below normal, which will moderate supplies. Prices, which were very strong last season, except for pecans, are expected to continue strong this season in spite of larger supplies. Quality of the U.S. crops is excellent this year and foreign supplies have moderated, which will further improve prospects for U.S. exports. A stronger U.S. domestic market is also likely this season. Acreage of most tree nuts is expected to increase for the next several years, which could lead to larger crops in the future.

Keywords: Tree nuts, production, exports, imports, stocks, marketing year

The United States leads the world in the production and export of tree nuts. The United States produces more than one-third of the total world output of tree nuts, followed by Turkey with about 25 percent (mostly hazelnuts), China 12 percent (mostly walnuts), and Iran with about 5 percent (mostly pistachios). The United States also commands about 40 percent of world tree nut exports. During the current marketing season, the U.S. share of world tree nut production and exports will increase due to a record U.S. output and smaller crops in competing countries for some nuts. In 1997, the United States will produce about 2.4 billion pounds of all tree nuts (in-shell basis) including the following and their approximate share of the total: almonds (57 percent), walnuts (19), pecans (13), pistachios (6), hazelnuts (3), and macadamia nuts (2).

Turkey, the world's second-largest tree nut producer, leads the world in output of hazelnuts and also produces significant quantities of walnuts, almonds, and other tree nuts. The United States ranks second behind China in walnut production and Iran in production of pistachios, but it produces the most almonds and pecans. For pistachios, the production pattern will be very different in 1997. The United States anticipates a record pistachio crop, while a small crop is expected in Iran due to a freeze during the bloom period. China matched the United States in walnut production in 1994, surpassed U.S. output in 1995, and continues to increase production. Similarly, the United States currently leads Australia in macadamia nut production, but Australian output is growing faster and will probably surpass U.S. production before 2000. The United States will remain the leading almond producer, typically accounting for 65-70 percent of the world total and four times as much as Spain, the second-largest almond producing country. The United States commands about 80 percent of total world almond exports.

Although world pecan production is not known, the United States is clearly the world's largest producer and ahead of Mexico. The two countries probably provide for at least 90-95 percent of world production of this nut. Australia accounts for most of the remainder, but there is also minor production in some other countries such as Israel and South Africa. The U.S. crop is typically 2.5-3 times the size of the Mexican crop, but U.S. production varies considerably and Mexico's output continues to trend upwards. A substantial portion of U.S. pecan production consists of seedling and native pecans for which yields vary each year. Virtually all of Mexico's production consists of improved pecan varieties in well-managed orchards. New plantings have nearly ceased in Mexico. However, production will continue to climb as young trees mature, resulting in higher yields. Mexican growers are emphasizing chemicals, fertilizers, and other inputs needed for their existing trees and crops rather than planting additional acreage.

Major U.S. Tree Nut Markets Are EU, Asia, and Canada

The United States exported $1.4 billion of all tree nuts or about 424,000 metric tons in 1996. More than one-half of all U.S. tree nut exports go to the European Union, where primary markets include Germany, Spain, the Netherlands, United Kingdom, France, and Italy. Other significant European markets are Belgium, Sweden, Denmark, and Switzerland. Latin America buys about 5 to 10 percent of all U.S. tree nut exports, with Mexico representing one-half of the export value to Latin America. Canada generates 10 to 15 percent of total purchases while Asia consumes about 25 percent of all U.S. tree nut exports. The major Asian market is Japan, which imports as much as Canada. Other important markets are South Korea, Hong Kong, Taiwan, India, and Israel.

Exports Trend Higher While Consumption Plateaus

U.S. exports have varied over the past 5 years from 500 to 635 million pounds, shelled equivalent, and typically account for about 39 percent of the total available supply (production, stocks, and imports). This quantity is about twice the volume that was marketed in the early to mid-1980's.

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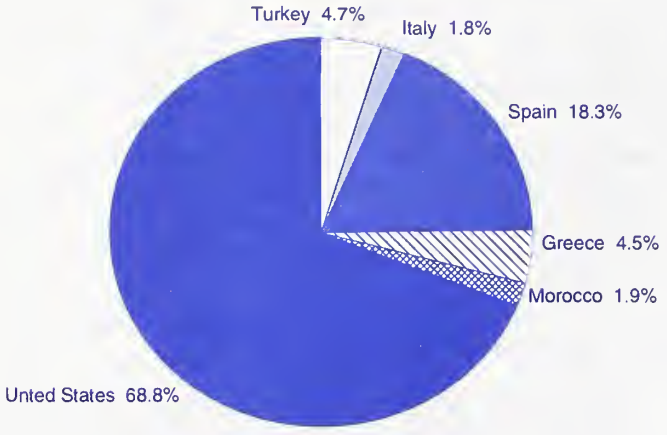
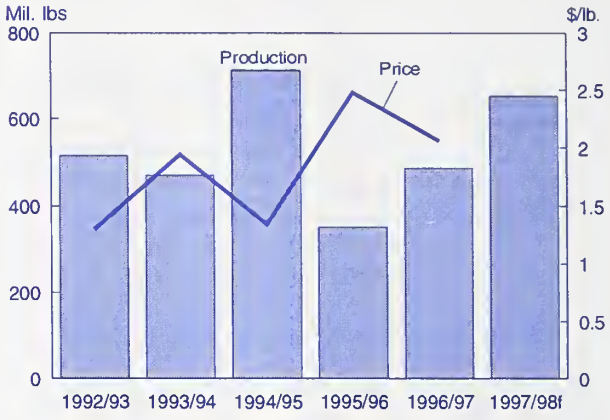
Tree Nuts at a Glance

World Almond Production 1996/97

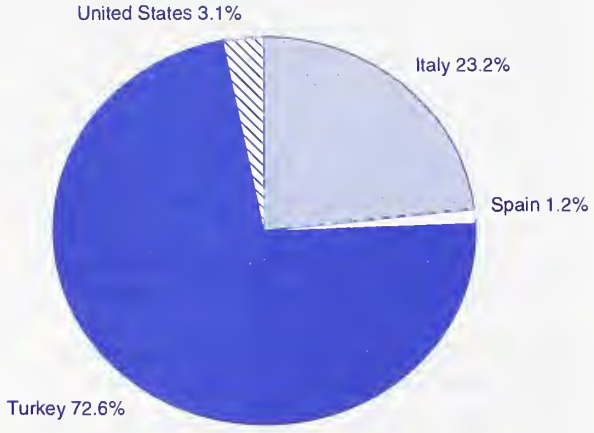


U. S. Almond Marketable Production and Grower Price (shelled basis)

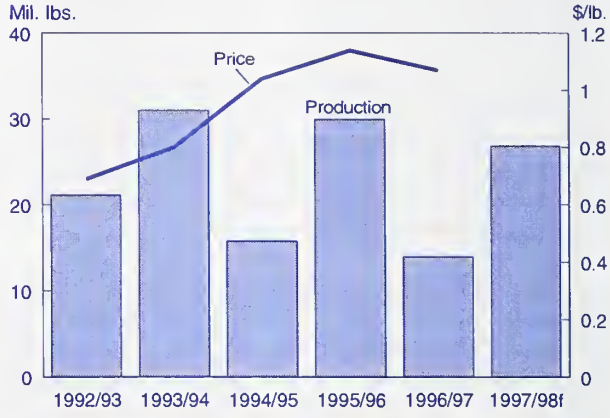


f = USDA forecast.

World Hazelnut Production 1996/97

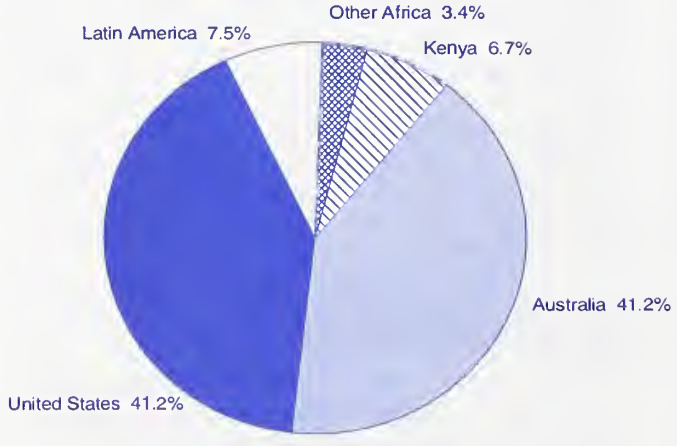


U. S. Hazelnut Marketable Production and Grower Price (shelled basis)



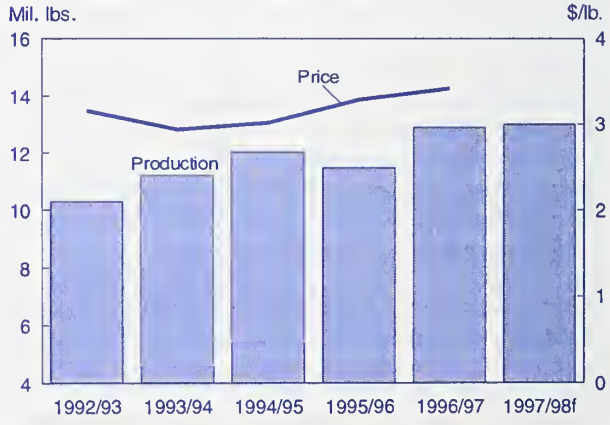
f = Industry forecast.

1996/97 Forecast Macadamia Production



Source: International Tree Nut Council

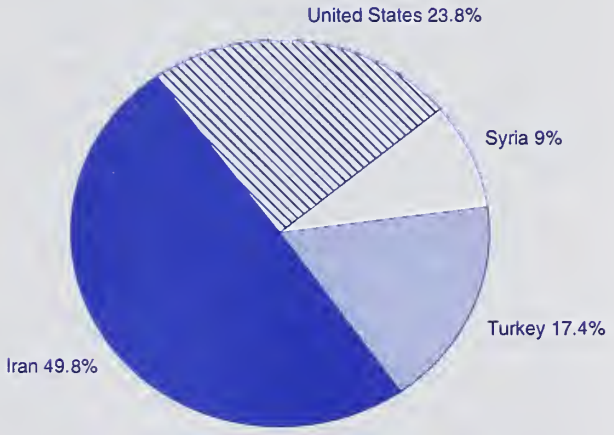
U. S. Macadamia Marketable Production and Grower Price (shelled basis)



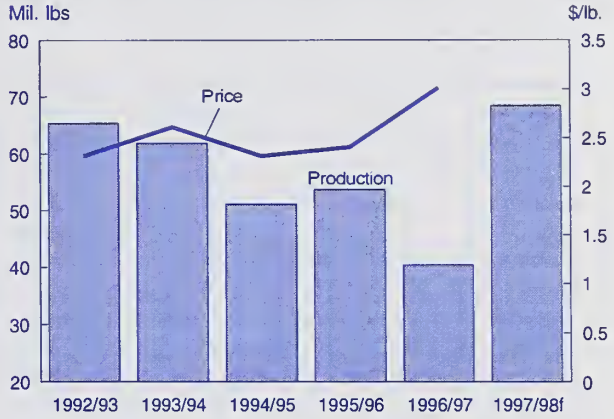
f = Trend forecast.

Tree Nuts at a Glance

World Pistachio Production 1996/97

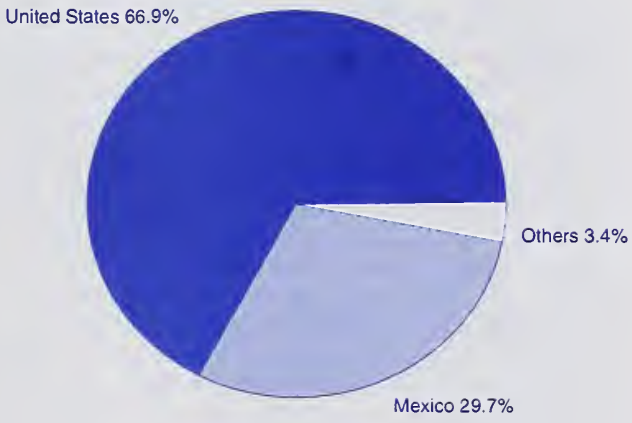


U. S. Pistachio Marketable Production and Grower Price (shelled basis)

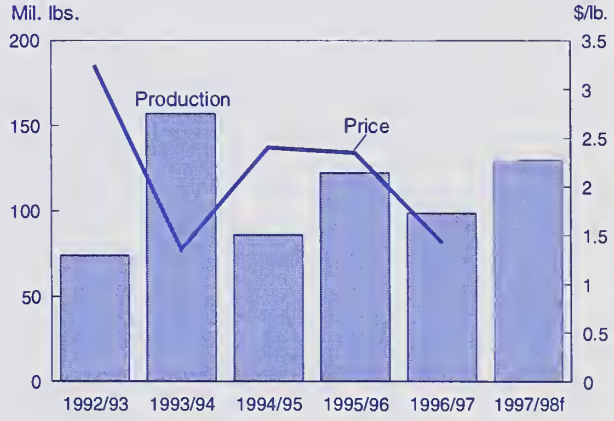


f = Industry forecast.

World Pecan Production 1996/97

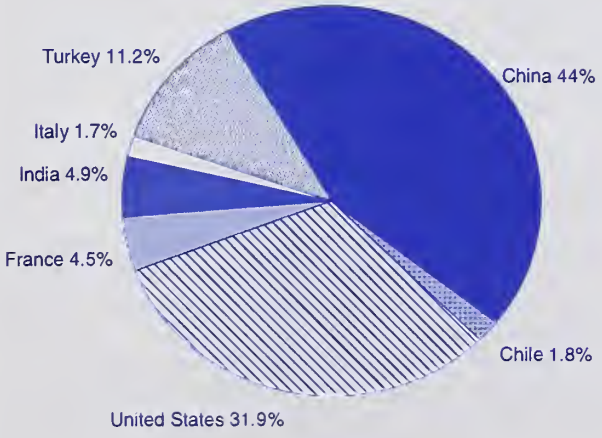


U. S. Pecan Marketable Production and Grower Price (shelled basis)

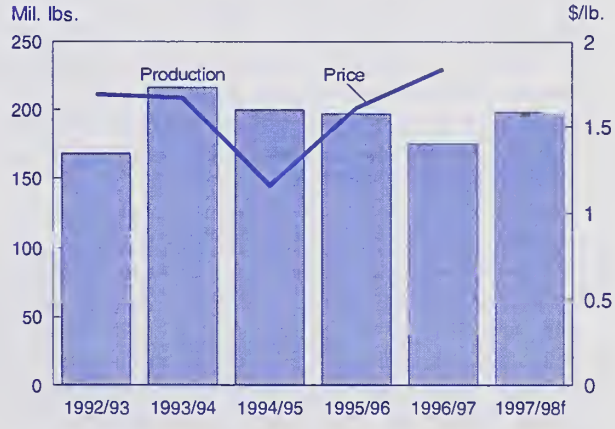


f = Industry forecast.

World Walnut Production 1996/97



U. S. Walnut Marketable Production and Grower Price (shelled basis)



f = USDA forecast.

Twenty years ago, domestic use accounted for 65-70 percent of the total tree nut disposition (domestic supply plus export). Prior to the mid-1980's, exports generally equaled one-half or less of domestic consumption. Marketing year 1991/92 proved the first time that U.S. exports exceeded domestic consumption, and this event occurred again in 1994/95. Within several years, exports could provide nearly two-thirds of total disposition, while domestic use accounts for the remainder.

This rapid growth in exports, especially since 1985, has made the export market increasingly important to the U.S. tree nut industry. For example, the value of almond exports for the 1995/96 marketing season (July 1-June 30) hit a record $861 million and the 1996/97 marketing year will also be another "high-value" year, underpinning record cash receipts paid to growers. The 1997/98 season could exceed previous records. While domestic markets are still very substantial to U.S. tree nut growers, their relative importance when compared with export markets has fallen. Growth in domestic consumption has been approximately 1 percent yearly or about the same as population growth. Per capita consumption of all tree nuts in the United States has actually fallen during the past 3 years and now appears to be holding steady at about 2.2 pounds.

Almonds Account for 71 Percent Of U.S. Tree Nut Exports

Almonds represented more than $1 billion (including prepared and preserved almonds) or 71 percent of all U.S. tree nut exports in 1996. Almonds remain one of the most important agricultural commodities exported, ranking in the top 10 behind beef, chicken, corn, soybeans, wheat, tobacco, cotton, and rice. Also, almond exports exceed all other fresh and prepared fruit and vegetable categories, including grapes and grape products (raisins, wine, etc.).

Seventy percent of almond exports enter Western European markets, with Germany being the major buyer (table A-1). Asia is the second most important market with 23 percent of the total. Japan typically purchases about one-half of U.S. almond exports to Asia. Even with higher prices into principal almond markets, U.S. exports increased substantially last year. U.S. exports to Western Europe during 1996 jumped 36 percent from the prior year and significant increases also occurred in Asia, especially South Korea, Hong Kong, and Taiwan. Higher shipments were also noted to Canada, Oceania, and Mexico. The expanded U.S. exports were demand-driven in spite of a larger world supply and exports last season. For the 1997/98 marketing year, world beginning stocks are very low. The higher expected almond production this season in many countries should not overburden world demand.

Since 1994, the U.S. almond industry has promoted almonds in China through USDA's Market Access Program (MAP) which has helped boost exports to Asia. Based upon a much larger supply this season, U.S. almond exports and domestic use during the 1997/98 season should rise substantially from the prior season. Other tree nut industries, such as walnuts, hazelnuts, and pistachios, have also received MAP assistance to access markets and boost exports.

Most exported almonds are sold shelled to processors and bakers for manufacturing purposes, such as for almond paste (marzipan), but also as whole or sliced shelled almonds for the confectionary trade. European purchasers prefer whole or sliced shelled almonds. However, for the Middle Eastern countries like Israel and Saudi Arabia, and for many Mediterranean markets, almonds frequently are sold in-shell for traditional snack use by consumers. U.S. uses are very different than export uses. The Almond Board of California estimates U.S. domestic consumption of almonds by the following categories, in order of importance: candy (32 percent), cereal (10), snack nuts (10), ice cream (7), food service (7), in-shell (7), cookies and granola (3), baking (2), and all other uses (22 percent).

Walnuts Are Second in Tree Nut Exports

Sales of U.S. walnuts to foreign markets totaled more than $201 million in 1996, 15 percent of the value of all U.S. tree nut exports. Principal markets for walnuts, shelled and unshelled, are comprised of the EU (mostly Germany, Spain, and Italy), Asia (mostly Japan), Israel, and Canada. Steady growth in demand for U.S. walnuts is the trend in European markets, while much stronger growth characterizes Asian markets. Walnut sales to Mexico declined in 1996, probably due to larger supplies of pecans and higher walnut prices.

Pistachio Exports To Jump in 1997

Pistachios are the third most important U.S. tree nut export. Principal markets include Asia, Europe, and Canada. Mexico's consumption is also significant and increasing. Hong Kong is the most important export market for pistachios, and Canada ranks second. Japan, Taiwan, and South Korea are also major markets. Germany, Belgium, and the United Kingdom are the principal European markets. USDA's Market Access Program has boosted export demand for U.S. pistachios by promoting in new and emerging markets. This strategy has also helped to boost overall pistachio demand and lift U.S. grower prices. An improved U.S. supply situation for the 1997/98 marketing year should increase exports. World supplies may not expand appreciably from last season because Iran's 1997 crop suffered serious frost damage, although the extent of the freeze damage is unknown. Typically, 1997 should be an "on-year" of the alternate-bearing cycle for both Iran and the United States, while 1996 was an "off-year" with both countries reporting below normal production. Because the United States will have a much larger proportion of the world supply, U.S. exports should increase substantially during the latter part of 1997 and first half of 1998.

Pecans Face Stiff International Competition From Other Nuts

Pecans rank fourth in value among U.S. tree nut exports. Canada is the primary market followed by Mexico. However, Mexico's imports are misleading, as perhaps one-half or more of the volume shipped across the border are in-shell pecans that will be cracked out and shipped back to the United States. Other principal world pecan markets include the Netherlands, United Kingdom, France, Germany, and Israel. Much of the product shipped to Israel is in-shell

for retail consumer use, while most of the European product is shelled and destined for manufacturing use. Export demand for pecans varies depending upon domestic prices and the available supply of competing nuts in international markets, especially walnuts and hazelnuts.

Hazelnut markets are similar to those for walnuts with major importers including Germany, Italy, Spain, Canada, Israel, other Asian markets, and Oceania (mostly Australia and New Zealand). Pecans are typically higher priced in wholesale markets than walnuts, hazelnuts, or almonds. When supplies are available, consumers and industrial users will select other nuts rather than pecans due to the price differential and much smaller availability of pecans. For the 1997/98 marketing season, supplies of nuts that compete with pecans are projected to increase, which will lower pecan demand.

Tree Nut Imports Equal One-Third of Exports

Most U.S. tree nut imports are cashews and Brazil nuts, which the United States does not produce because they are grown in the tropical climates. Last year cashew imports were $301 million. U.S. tree nut imports in 1996 totaled $536 million (including coconut meats), about one-third the value of exports (table A-2). Although imports of hazelnuts, pecans, and pistachios are less than exports, their volume and value are still substantial and add to the total supply. Most of the imported pecans are grown in Mexico, but some are U.S. pecans processed in Mexico and returned to the U.S. market. The United States also imports substantial amounts of macadamia nuts (mostly from Australia, but also Central America and Africa), Brazil nuts from South America, chestnuts (mostly Italy), and pignolia nuts (mostly China). Imports of almonds, walnuts, and other tree nuts are minor.

Use of Tree Nuts Is Changing

While a larger portion of the total U.S. tree nut supply is being exported (both for shelled and in-shell product), a higher proportion of most tree nuts is also being sold shelled. This development primarily reflects greater demand from manufacturers in the United States and abroad who seek more convenience. Industry reports indicate that confectioners and cereal manufacturers are taking a larger portion of the almond and hazelnut distribution, while baking use may be decreasing. Bakers and ice cream manufacturers still take a big share of the walnut and pecan distributions for processors, but cereal use of these nuts has also increased. Cereal manufacturers are now using tree nuts in new hot and cold cereal products.

Studies of U.S. consumer snacking behavior reveal that consumption of snack foods is at record levels and rising. Data from the 1996 Snack Food Association's *Consumer Snacking Behavior Report* shows total per capita U.S. snack consumption at 21.7 pounds and snack nuts at 1.6 pounds. Snack nuts account for 9 percent of the total snack market volume (5.69 billion pounds) or 7 percent of the total retail dollar sales ($15.05 billion).

In comparison to snack use in the United States, snacking in Europe remains very low. For example, in 1994 estimated snack consumption in Germany reached 5.1 pounds per capita, while consumption in other EU countries ranged from a low of 2.2 pounds in Italy to a high of 11.5 pounds per capita in United Kingdom. U.S. snack exports are increasing rapidly, rising almost 50 percent from $592 million in 1991 to $885 million in 1994. Recent trends in the U.S. snack industry indicate strong growth in reduced-fat, low-fat, and no-fat snacks. This snack category increased 20 percent in 1994 from the previous year and is the fastest growing segment of the snack food industry. Data are not available to indicate the share of tree nuts or nuts in general of this market.

Table A-1--U.S. tree nut exparts: Majar warld markets, 1996

Reglan and country	Almands	Hazelnuts	Pistachias	Walnuts	Pecans	Other 1/	Tatal
				Value ($ 1,000)			
Canada	41,474	1,820	8,193	12,597	18,463	8,458	91,005
Latin America	15,135	2,401	5,026	9,413	11,599	8,012	51,586
Mexica	8,390	397	1,361	649	11,522	779	23,098
Other 2/	6,745	2,004	3,665	8,764	77	7,233	28,488
W. Eurape	700,535	11,439	14,434	118,858	15,787	16,925	877,978
Sweden	19,018	0	176	954	302	6	20,456
Denmark	19,508	0	0	795	12	52	20,367
United Kingdam	67,726	973	1,029	4,818	3,929	2,249	80,724
Netherlands	66,994	0	784	15,440	6,713	6,564	96,495
Belgium	27,605	0	3,033	813	109	699	32,259
France	73,660	349	356	709	2,086	1,772	78,932
Germany	243,980	6,436	7,892	28,462	2,156	1,748	290,674
Spain	99,669	1,533	0	34,327	214	1,187	136,930
Italy	34,026	2,050	78	24,416	168	727	61,465
Norway	8,266	25	210	1,671	97	1,200	11,469
Switzerland	20,668	0	875	1,407	0	508	23,458
Other 3/	19,415	73	1	5,046	1	213	24,749
Other Eurape 4/	4,964	0	3,540	32	0	1,635	10,171
Asia	234,688	4,705	50,213	54,181	3,473	20,567	367,827
Israel	11,562	1,316	528	10,390	2,092	1,106	26,994
India	25,670	0	0	0	0	98	25,768
Japan	110,147	14	5,401	38,083	645	11,126	165,416
Karea	15,686	0	3,139	2,330	405	760	22,320
Hang Kang	15,074	853	29,066	294	173	3,546	49,006
Talwan	13,295	19	4,290	2,637	48	1,212	21,501
Other 5/	43,254	2,503	7,789	447	110	2,719	56,822
Oceania 6/	13,198	1,361	3,932	5,630	457	787	25,365
Africa	5,900	285	285	661	3	230	7,364
World total	1,015,894	22,011	85,623	201,373	49,781	56,614	1,431,296

1/ Brazil nuts, cashews, pignalias, pine nuts, etc.

2/ Central America, Caribbean, and South America.

3/ Finland, Ireland, Austria, Partugal, Greece, Iceland, Gibraltar, and Malta Gaza.

4/ Eastern Europe including Hungary, Paland, Ramania, Former Czechoslavakia, Farmer Yugaslavia, Bulgaria, Farmer Soviet Union including Russia, Ukraine, etc.

5/ Western Asia (Middle East), Southern Asia, China, and Southeast Asia.

6/ Australia, New Zealand. French Pacific Island, and other Pacific Rim Islands.

Source: Foreign Agricultural Trade af the United States, FATUS, Calendar Year 1996 Supplement, USDA/ERS, July, 1997.

Table A-2--U.S. tree nut imports: Major world suppliers, 1996

Region and country	Brazil nuts	Cashews	Chestnuts	Coconut meat	Hazelnuts	Macadamias	Pecans	Pistachios	Other 1/	Total
					Value ($ 1,000)					
Canada	6	52	0	1,631	153	0	0	4	23,776	25,622
Latin America	19,518	127,593	18	12,415	0	6,446	42,501	0	5,965	214,456
Mexico	0	0	0	1,424	0	39	42,433	0	731	44,627
Guatemala	0	254	0	0	0	3,523	0	0	103	3,880
Costa Rica	0	0	0	753	0	2,035	0	0	0	2,788
Dominican Rep.	0	2	0	10,063	0	0	0	0	4	10,069
Peru	3,013	51	0	0	0	0	68	0	29	3,161
Bolivia	8,298	106	0	0	0	0	0	0	0	8,404
Chile	1,083	134	0	18	0	0	0	0	0	1,235
Brazil	7,019	126,657	0	3	0	817	0	0	17	134,513
Argentina	0	0	18	0	0	0	0	0	5,074	5,092
Other 2/	105	389	0	154	0	32	0	0	7	687
W. Europe	53	175	9,319	232	620	108	0	41	2,692	13,240
Spain	0	67	243	0	0	0	0	0	960	1,270
Italy	0	0	8,700	0	255	0	0	30	221	9,206
Other 3/	53	108	376	232	365	108	0	11	1,511	2,764
Other Europe 4/	0	0	0	0	0	0	0	0	0	0
Asia	0	157,859	1,244	49,878	13,683	218	54	1,396	24,149	248,481
Turkey	0	90	43	0	13,627	0	0	1,233	429	15,422
India	0	146,417	0	3	55	0	0	0	1,033	147,508
China	0	1,018	228	42	0	215	0	53	18,898	20,454
Thailand	0	52	0	5,372	0	0	0	0	52	5,476
Vietnam	0	7,791	0	32	0	0	0	0	72	7,895
Singapore	0	904	0	51	0	0	0	0	282	1,237
Indonesia	0	1,212	0	579	0	0	0	0	59	1,850
Philippines	0	3	0	41,950	0	0	0	0	188	42,141
Korea	0	0	897	0	0	0	0	4	234	1,135
Hong Kong	0	37	60	23	0	0	0	9	1,309	1,438
Other 5/	0	335	16	1,826	1	3	54	97	1,593	3,925
Oceania	0	17	0	0	0	10,524	1,262	0	103	11,906
Australia	0	17	0	0	0	10,524	1,262	0	103	11,906
Other 6/	0	0	0	0	0	0	0	0	0	0
Africa	0	15,445	0	8	0	6,310	0	100	83	21,946
Kenya	0	2,029	0	0	0	2,415	0	0	0	4,444
Mozambique	0	12,722	0	0	0	0	0	100	0	12,822
Rep. S. Africa	0	536	0	0	0	2,312	0	0	0	2,848
Malawi	0	0	0	0	0	1,398	0	0	0	1,398
Other	0	158	0	8	0	185	0	0	83	434
World total	19,576	301,141	10,581	64,163	14,455	23,606	43,817	1,542	56,769	535,650

1/ Almonds, walnuts, pignolias, etc.

2/ Other Central America, Caribbean, and Sauth America.

3/ Germany, France, United Kingdam, Scandinavia, Switzerland, Ireland, Austria, Portugal, Greece, Iceland, Gibraltar, and Malta Goza.

4/ Eastern Europe including Hungary, Paland, Romania, Farmer Czechaslavakia, Farmer Yugaslavia, Bulgaria, Farmer Saviet Union including Russia, Ukraine, etc.

5/ Western Asia (Middle East), Sauthern Asia, China, and Southeast Asia.

6/ New Zealand, French Pacific Island, and other Pacific Rim islands.

Saurce: Foreign Agricultural Trade of the United States, FATUS, Calendar Year 1996 Supplement, USDA/ERS, July, 1997.

Barriers to Trade in Global Apple Markets

by
Barry Krissoff, Linda Calvin, and Denice Gray[1]

Abstract: Horticultural product trade has expanded considerably; U.S. fresh apple exports increased from $11 million in 1970 to $382 million in 1996. High tariff rates and technical barriers, however, continue to constrain international sales of apples to some markets. Phytosanitary protocols related to fire blight, codling moth, apple maggot, and other pests prohibit or limit U.S. apple exports to some countries. Tariff rate equivalents for phytosanitary requirements are estimated for Japan, South Korea, and Mexico and are sometimes found to be as large or larger than many tariff rates, ranging up to 58 percent. Removing tariffs and harmonizing these regulatory measures to current U.S. systems approaches to pest management for the three countries would substantially affect global apple trade, increasing imports by $205 million in 1994/95 and by $280 million in 1995/96.

Keywords: Apples, international trade, tariffs, phytosanitary requirements, technical barriers, Japan, South Korea, Mexico.

Introduction

International trade in fresh apples more than tripled in the last 25 years, reaching 5 million metric tons in 1995. U.S. participation in this expansion has been significant, with U.S. apple exports totaling 590,649 metric tons in 1996, up 1,096 percent from 1970. Yet, there remain considerable barriers to trade. Several important trading partners maintain tariffs and technical barriers (TBs) that limit the flow of fresh apples across borders. Some countries prohibit imports of apples.

TBs are import standards or regulations that reflect a country's concern and valuation for safety, health, food quality, and the environment (Roberts and DeRemer; Hillman; and Thilmany and Barrett). TBs include: sanitary and phytosanitary measures related to food safety, animal and plant health; food standards of definition, measurement, and quality; and environmental or natural resource conservation measures.

Unlike a tariff, a TB may increase national social welfare if it rectifies a failure of the market to incorporate product or production method attributes in the product price. These attributes can be important to consumers and producers. For example, if a country is free of a damaging pest, imports from a country with that pest may be regulated on the grounds that the market price does not reflect the potential costs to society of pest infestation and eradication efforts. In the case of apples, some countries have concerns about the spread of fire blight, a bacterial disease that affects apple trees, and insects such as the codling moth and apple maggot. Some countries have implemented various phytosanitary protocols to reduce the risk of disease or pest infestation.

TBs insulate an importing country's domestic market from the world market, thus reducing (or eliminating) imports. With TBs limiting imports, domestic consumer and producer prices rise relative to world market prices, affording the domestic industry a measure of import protection. An importing country may apply different regulatory measures for different exporters. Import requirements in the plant health area are often bilateral because pest problems differ across countries, putting some countries at a comparative disadvantage.

Since the negotiation and signing of the Uruguay Round Agreement, tariffs have declined, but policymakers, agribusiness interests, and economists voice growing concerns that TBs now play a relatively more substantive role in limiting trade flows across countries. There are at least two key issues. First, do the technical measures target problems of market failure and provide a net social welfare gain to importing nations, or are they just a rationale to protect the domestic industry from foreign competition? Second, what are the trade and price effects of the TBs on importing and exporting nations? Both are complex issues; our focus here is on the latter. We examine the role of the United States in international apple markets, and investigate how tariffs and TBs create exporter-importer price differentials for Japan, South Korea, and Mexico. We focus only on TBs related to phytosanitary concerns. Finally, we estimate how eliminating these price differentials would affect international trade flows.

The U.S. Apple Market and Trade

Apples are the third most valuable fruit crop grown in the United States, behind grapes and oranges. In 1996, the value of the commercial apple crop was $1.7 billion. Production has grown from an annual average of 6.5 billion pounds in 1970-75 to 10.4 billion pounds in 1990-96. In 1994, production reached a record 11.6 billion pounds.

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Apple production is spread across many States, but Washington, Michigan, New York, and California dominate, typically accounting for 75 percent of total production. In 1996, 61 percent of commercial apple production went to the fresh market. Washington is the largest producer for both the fresh and processed market. Because of its large production and long-term storage technology, Washington ships apples to the fresh market year round and tends to account for the largest quantity shipped in any given month. In the 1995/96 marketing season (August 1995-July 1996), Washington accounted for 67 percent of the U.S. fresh apple supply. Michigan and New York shipments are heaviest from fall through spring, while California ships its largest amounts in the fall. In the spring, the United States supplements domestic supplies with imports from Southern Hemisphere producers.

Although many varieties of apples are produced in the United States, Red Delicious remains the most common. The U.S. Apple Association estimates Red Delicious production at 42 percent of the 1996 U.S. crop. Golden Delicious is the second most popular, with 14 percent of production. Granny Smith, Rome, and McIntosh comprise approximately 7, 6, and 5 percent of the market, respectively. These varietal shares have been rather stable over the 1990s. In contrast, Fuji and Gala apple production have increased rapidly, each growing from less than 2 percent of the market in the early 1990s to over 5 and 3 percent, respectively, in 1996. Jonathan, York, Stayman, Winesap, and other varieties have decreased in importance. This is an important structural change in the industry as producers are responding to high prices for the fresh export market and changing consumer preferences for sweeter apples. Fuji and Gala apples are particularly popular in important Asian export markets.

Americans consumed over 5 billion pounds of fresh apples in 1995/96, averaging 19 pounds per person. This level of per capita consumption is equal to the average of the previous 10 years. Because U.S. apple production increased while domestic fresh apple consumption remained relatively constant, exports are even more critical to the health of the domestic industry.

In 1995/96, the United States was the world's second largest fresh apple exporter. Washington State apples accounted for an estimated 79 percent of total U.S. exports in 1995/96. France, the Netherlands, and Italy were the first, third and fourth largest exporters. Much of European exports are intra-European. Chile was the fifth largest exporter.

Taiwan, Mexico, and Canada were the largest markets for U.S. fresh apples in the 1995/96 season, accounting for 47 percent of total exports (table B-1). The most important markets are in Asia and the Americas. Of the top 16 export markets in 1995/96, all but the United Kingdom, Saudi Arabia, and the United Arab Emirates fell within this area. Most exports to Russia are to the Far East region of that country. Given the importance of exports to Pacific Rim countries, the huge growth in the Chinese apple industry is of concern. China is the world's largest apple producer and production increased 54 percent between 1993 and 1995.

Table B-1--Top U.S. apple export markets, 1995/96 1/

Country	Exports	Share of exports
	Metric tons	Percent
Taiwan	100,046	18.1
Mexico	79,278	14.4
Canada	78,952	14.3
Indonesia	48,508	8.8
Hong Kong	45,245	8.2
Thailand	25,570	4.6
United Kingdom	22,386	4.1
Philippines	17,721	3.2
Malaysia	16,136	2.9
Brazil	13,207	2.4
Saudi Arabia	13,051	2.4
Singapore	10,203	1.8
Russia	9,070	1.6
United Arab Emirates	7,211	1.3
Colombia	7,152	1.3
Guatemala	5,533	1.0
Total exports	552,129	100.0

1/ U.S. apple marketing year is August to July.

Source: U.S. Department of Commerce

In this article, our country coverage focuses on Japan, South Korea, and Mexico (see table B-2). These three countries are important actual or potential export markets for the United States, and each has important phytosanitary requirements or a ban on the import of apples from the United States. Currently, Japan limits imports of U.S. apples to Red and Golden Delicious apples from Washington and Oregon that have gone through rigorous import requirements. Exports to Japan have not been very profitable under these conditions. During the 1997/98 season there will be no U.S. apple exports to Japan because no growers have registered for the export program. South Korea bans apple imports from the United States because of phytosanitary concerns. In contrast, Mexico imports large quantities of apples from specified regions of the United States despite costly phytosanitary requirements.

Japan

Japan is a major producer and consumer of apples. In 1995/96, Japan produced 963,300 metric tons of apples, making it the world's twelfth largest producer. Apple production is experiencing a slight downward trend, consistent with the general contraction of the Japanese agricultural sector. From 1990 to 1995, Japan's apple production declined 9 percent. Imports and exports both account for 1 percent or less of consumption. In 1995/96, Japan imported small amounts of apples from the United States, South Korea, and New Zealand. Japanese apples are famous for their very high quality and prices. Production costs for such expensive and high quality fruit are also high. Apples are often used as gifts and consumed as desserts rather than as snacks. Most apples are consumed fresh. Japan's processing sector used 17 percent of the apple crop in the 1995/96 marketing season.

Fuji and Tsugaru apples, which are particularly sweet and juicy, are the favorite varieties among Japanese consumers. Fuji is the most important apple with 52 percent of production

Table B-2--U.S., Japanese, South Korean, and Mexican apple production, trade, and consumption: 1994/95 and 1995/96 1/

		United States		Japan		Korea		Mexico	
		1994/95	1995/96	1994/95	1995/96	1994/95	1995/96	1994/95	1995/96
Production 2/	Metric tons	5,216,584	4,801,274	989,300	963,300	616,505	715,982	488,000	427,000
Production (commercial) 3/	"	5,139,836	4,712,824	909,700	879,100	616,505	715,982	438,000	387,000
Fresh imports 4/	"	130,149	173,913	8,900	1,089	0	0	80,000	80,000
Fresh exports 5/	"	692,511	552,129	1,800	2,506	2,293	5,315	0	0
Processing 6/	"	2,252,176	2,062,393	182,400	163,000	123,301	143,196	85,000	70,000
Consumption	"	2,325,298	2,272,215	814,000	798,883	490,911	567,471	483,000	437,000
Imports share of consumption	Percent	6	8	1	0	0	0	17	18
US share of imports	"	n.a.	n.a.	95	77	0	0	99	99

n.a. = not applicable

1/ For the United States and Mexico the marketing year is August-July and for Japan it is July-June. 2/ Commercial production in the United States. 3/ Utilized production in United States. 4/ Mexican imports are on a calendar year basis. Assuming calendar year 1995 exports are shipped to Mexico during the 1994/95 marketing year and calendar year 1996 exports are shipped during the 1995/96 marketing year. 5/ Exports for Korea are on a calendar year basis. 6/ The volume of Korean apples going to the processing market is estimated.

Source: Economic Research Service, Foreign Agricultural Service, and Statistical Yearbook of Foreign Trade, Customs Service, Republic of Korea, 1994 and 1995.

in 1995/96. Fuji apples are marketed year round although few are sold during the summer months. Tsugaru apples accounted for 15 percent of production in 1995/96. Japanese Red Delicious apples accounted for about 2 percent of production. Red Delicious acreage has been decreasing, with a 20-percent decline in production from 1994/95 to 1995/96.

In 1994, Japan lifted its long-standing ban on imports of U.S. apples and allowed imports of Red and Golden Delicious apples from Washington and Oregon with certain phytosanitary requirements. These phytosanitary requirements are commonly viewed as the most restrictive of any country, short of an outright ban on apple imports.[2] Japan is concerned with the spread of fire blight, codling moths, and apple maggots.

Fire blight is a bacterial disease that affects apple trees. While an orchard may be slightly infected with fire blight, there may be no effect on the trees in many years. Environmental conditions, such as warm and humid weather at bloom time, can promote an outbreak. The disease can spread under these conditions if infectious material is in the air. Affected branches are cut off to prevent the spread of the disease. In severe cases, a tree might be removed. Once fire blight is established in a country, it is virtually impossible to eradicate because the bacteria has many cultivated and wild hosts. A search of world scientific literature strongly indicates there is virtually no risk of transmission by commercially produced fruit. Treating the fruit with a chlorine dip adds additional quarantine security. Chlorine dip is an inexpensive procedure and does not damage apples.

Japan claims its apple production areas to be free of fire blight and its regulations regarding fire blight are rigorous.[3] Japan requires a chlorine dip as one of several precautions against fire blight. Almost all countries accept U.S. systems approaches to pest management as an adequate precaution. A system approach consists of good commercial production practices, grading and sorting which further eliminates fruit with any pest infestation or damage, and visual inspection for pests. U.S. growers who wish to export apples to Japan must also register their acreage in advance for the Japanese protocol and comply with all phytosanitary requirements (see table B-3). An orchard shipping apples to Japan must be inspected three times each season by representatives of USDA's Animal and Plant Health Inspection Service (in the case of Washington apples, by a representative of the Washington State Department of Agriculture). The inspections must occur at bloom time, when the fruit size is 3 centimeters, and just prior to harvest when a Japanese inspector must be present. The Japanese inspector examines every tree in an orchard for evidence of fire blight. The orchard must have a 500-meter buffer zone with no pear trees or other natural fire blight host. The buffer zone is also inspected. If fire blight is found, all apples in that orchard block are banned from export to Japan for the season. The certification must be renewed each year.

Codling moths cause serious damage to apples. For most countries, U.S. systems approaches to pest control are considered adequate protection. Japan, as well as South Korean and Taiwan, claim to be free of codling moth. Japan requires a 55-day cold treatment to kill the eggs, followed by fumigation to kill the larvae. The U.S. Clean Air Act requires U.S. producers to stop using methyl bromide, the required fumigant for Japanese imports, by 2002.

During the 1994/95 season, the first year of apple trade with Japan, U.S. exports to Japan totaled 8,497 metric tons. The first shipments arrived in January 1995. Although U.S. apples accounted for 95 percent of imports, total imports were only 1 percent of Japanese consumption. U.S. exports declined in the 1995/96 season to 843 metric tons, shipped from December through April. Through March of the 1996/97 season, exports totaled only 106 metric tons. Acres enrolled in the Japanese apple export program totaled 2,406 in the 1994/95 season (with 2,508 in buffer zones), 2,123 in 1995/96, and 739 in 1996/97. No apple growers have registered acreage for the 1997/98 crop year.

[2] In addition to South Korea, other prominent examples of countries that completely ban imports of any U.S. fresh apples on phytosanitary grounds are Australia and Chile. India bans apple imports because of its balance of payments situation.

[3] Among major producers, only Japan claims to be free of fire blight. Australia did until recently. Australia bans all imports because of the threat of fire blight. In early 1997, evidence of fire blight was reported in two Australian botanical gardens. Australian officials confirmed the presence of fire blight in the botanical gardens but surveys have failed to detect fire blight in commercial orchards, nurseries, and other urban areas. The Australian Quarantine Inspection Service will survey Australian apple and pear orchards in their spring (October-November) of 1997 to determine fire blight status.

Table B-3--Fresh apples: Technical barriers to trade

	Apples allowed	Major phytosanitary requirements 1/	Pest problem
Australia	No		Fire blight
Chile	No		Unspecified 2/
China	Yes, but only Red and Golden Delicious from Washington, Oregon, and Idaho 3/	Cold treatment for apple maggot and use of a registered packinghouse	Apple maggot
		Routine visual inspection for evidence of fire blight	Fire blight
Japan	Yes, but only Red and Golden Delicious from Washington and Oregon	Statement that orchard is free of fire blight and use of a chlorine dip	Fire blight
		Methyl bromide fumigation for the larvae stage and 55-day cold treatment for the egg stage	Codling moth
Korea	No		Codling moth
Mexico	Yes, but only from certain States	Cold treatment which requires use of a certified cold treatment facility, plus inspections by Mexican officials (supported by the U.S. industry)	Apple maggot
		Leaves must not exceed a maximum average of two per box	Unspecified

1/ Phytosanitary requirements are complex, detailed, and subject to change. This table highlights only some major requirements for a few countries. More detail is provided in the text.

2/ The Ceris database does not specify the pests of concern but Chile is particularly concerned about fire blight, apple maggot, and plum curculio.

3/ China limits imports to these States due to concern over Mediterranean fruit fly.

Source: Ceris database, copyright held by Purdue Research Foundation

Several factors explain why U.S. apple exports failed in Japan. First, Japanese consumer demand was lower than expected. Exports to Japan were limited to Red and Golden Delicious apples, which are not as popular with Japanese consumers as sweeter varieties such as Fuji. In the first year of exports, many Japanese consumers were disappointed with the quality of the earliest U.S. apples to reach their market. Bad publicity regarding minute traces of a fungicide on U.S. apples that is not approved in Japan for post-harvest use further dampened consumer interest. Japan's Ministry of Health and Welfare determined that the fungicide was not considered dangerous to public health. U.S. industry representatives determined that the apples were accidentally contaminated during the packing process by apples treated with the fungicide and destined for other markets.

U.S. apples are not all the same high quality as Japanese apples. Japan has four grades. Washington apples can compete well with the lower Japanese grades and the best Washington apples available are thought to be comparable with the best Japanese grade (Schotzko). Traditionally, Japanese producers only marketed their best quality apples. U.S. apples were marketed as a cheaper, every-day apple, not a luxury gift apple. Prices 20-30 percent below comparable Japanese apples were an important part of this strategy.

Japanese producers responded to U.S. imports by marketing a lower quality apple (previously used for processing) at a price that was approximately 20 percent lower than the previous year. Producers also made some production changes to reduce labor costs. The changing Japanese marketing strategy also reduced demand for U.S. apples (Jenni).

For U.S. producers, the Japanese protocol is very expensive and risky. During the first year of the program, the extra cost of the protocol was estimated at $10 per carton, yielding an FOB price of about $26 per carton (Jenni). A grower could comply with the protocol and not produce any apples acceptable for the Japanese market. Japan's very expensive distribution system further increases costs of getting U.S. apples to Japanese markets. Limited demand, a high tariff (20 to 19 percent from 1994 to 1996), and the costly phytosanitary requirements have led to less profit in exporting to Japan than originally anticipated.

The United States is currently trying to expand Japanese import approval to other apple varieties that are more popular in Japan. The United States began negotiating with Japan in 1972 for entry of Red and Golden Delicious apples, the primary U.S.-grown apples at that time. Japan bans imports of a variety until tests for quarantine treatment for that vari-

ety have been completed, even if tests for other varieties of apples have been successful. The United States contends that each variety of apple should not have to be tested individually for the efficacy of the treatment for a quarantine insect pest. Following talks in June 1997, the United States and Japan failed to reach an agreement on this issue and the United States is now eligible to call for a World Trade Organization dispute panel to resolve the issue.

New Zealand began negotiating with Japan much later than the United States. Because many newer varieties were rapidly expanding acreage at that time, New Zealand began testing on Red Delicious, Royal Gala, Gala, Fuji, Braeburn, and Granny Smith—all of which are currently allowed into the Japanese market. New Zealand reached an agreement with Japan earlier than the United States and started exporting apples 8 months earlier. Fuji and Royal Gala have been the most important exports to Japan. Although New Zealand can export more varieties than the United States, growers in both countries have experienced some of the same problems trying to export apples profitably to Japan with such costly and risky phytosanitary requirements. In addition, New Zealand has had problems controlling for apple scab, which is not a serious problem for Washington growers because of their dry climate.

South Korea

South Korea is also a major apple producer, the world's seventeenth largest. In 1995/96, South Korea produced 715,982 metric tons of apples, up 16 percent from the previous year because of high yields. Apple production area declined from 50,000 hectares in 1994/95 to an estimated 44,000 in 1995/96. The U.S. Embassy in South Korea attributes the decline in area to increasing imports of other types of fruits that provide alternatives to apples, and to a shift in consumer preferences towards pears. Fuji is the most important variety of apple produced in Korea with 77 percent of total production in 1992. Tsugaru and Jonagold account for 12 and 1 percent of production. Most apples are consumed fresh with only about 20 percent going into the processing sector.

South Korea imports no apples because of phytosanitary concerns. But if apple imports were allowed, the high tariff (50 to 49 percent from 1994 to 1996) would still be a serious deterrent to trade. Exports are small and of very high quality. In 1994, exports totaled 2,293 metric tons and in 1995 they rose to 5,315 metric tons. Taiwan is South Korea's primary export market with 43 percent of total exports in 1995. Production techniques for these export-oriented apples are very labor intensive. U.S. industry analysts suggest that South Korean Fuji apples are approximately equivalent to Washington Extra Fancy grade and that any exports to that country would have to be of a similar high quality.

Mexico

Mexican commercial apple production totaled 387,000 metric tons in 1995/96, down 12 percent from the previous year. Mexico's main apple producing areas have suffered the effects of drought during the 1994/95 and 1995/96 seasons and the increase in competition from the United States since ratification of the North American Free Trade Agreement (NAFTA). Golden and Red Delicious apples are the main varieties grown in Mexico. In Chihuahua, Mexico's most important apple producing state, about 60 percent of production is Golden Delicious and about 40 percent is Red Delicious. Golden Delicious production in Chihuahua is increasing relative to Red Delicious.

Mexico was a minor market for U.S. apples in 1990. Trade increased rapidly after Mexico eliminated import permits in 1991 and after intensive negotiations to develop a phytosanitary work plan. Apple tariffs were 20 percent before NAFTA but under the trade agreement they are phased out over a 10-year period. By the 1995/96 season, Mexico was the second most important market. U.S. exports to Mexico increased from 11,326 metric tons in the 1989/90 season to 157,108 metric tons in the 1993/94 season. Although exports fell during the Mexican economic crisis beginning in late 1994, they are slowly recovering.

Mexico imported 80,000 metric tons of apples in 1995/96, accounting for 18 percent of fresh consumption. In 1993/94, that figure was 28 percent but it fell to 17 percent in 1994/95 during the peso crisis. Most Mexican apple imports are from the United States, with smaller amounts from Canada, Chile, and New Zealand. Mexican storage facilities are somewhat limited, so much of the production is sold early in the crop year. Imported apples usually dominate the Mexican market later in the season, from January through the end of the crop year. Red and Golden Delicious are the most common varieties of apples shipped to Mexico, and all grades of apples are shipped to supply the diverse needs of the Mexican market. Average Mexican apple quality is generally considered to be lower than the average U.S. quality.

Phytosanitary certificates are required for export to Mexico due to concerns primarily regarding apple maggot. Apple maggot is a fruit fly that lays eggs in the apple and the larvae damage the fruit. Most countries accept U.S. systems approaches for pest management as adequate protection against the threat of apple maggot. Fruit for export to Mexico requires cold treatment. For some other countries, proof that fruit came from an apple maggot free area is an alternative precaution. Based on a trapping and quarantine program, the central Washington apple production region is considered apple maggot free.

Currently apple exports to Mexico are limited to the States of Washington, Oregon, California, Idaho, Colorado, Utah, Michigan, New York, Pennsylvania, Virginia, and West Virginia, with the exception of any area regulated for fruit flies of quarantine importance. Within these areas, only storage/treatment facilities that have been inspected and cleared by Mexican phytosanitary officials can participate in the export program. To date, only producers in Washington, Oregon, and Idaho participate in the program, which is very expensive. These States can spread the cost of inspection over a large volume of apples. The Northwest apple industry is charged for the cost of Mexican inspectors who are in residence during the entire shipping season to monitor the pro-

gram. The industry collects money from shippers throughout the season to pay for the phytosanitary requirements.

At the beginning of the season, Mexican inspectors examine the storage/treatment facilities to ensure temperature probes are approved and calibrated. After the cold treatment is over, treatment records are reviewed. Apples destined for Mexico are subjected to cold treatment for 40 days at 32 degrees F or 90 days at 37.9 degrees F. Due to the cold treatment requirement, most U.S. apples are marketed in Mexico later in the season when much of the Mexican harvest has already been sold. The 40-day treatment carries more risk of low temperature damage to the fruit but is an attractive choice from a marketing perspective. Exports to Mexico must be free of plant debris and soil (there is a maximum average tolerance of two leaves per box which is more problematic for Golden than Red Delicious apples). This requirement is unique to Mexico.

Barriers to Trade

A TB measure may be a social welfare enhancing policy in the importing country if the expected gains associated with reducing the risk and cost of a pest infestation, for example, exceed the expected loss to consumers resulting from their reduced ability to purchase foreign products. A country's concerns about the entry of a foreign product may be based on sound scientific principles and risk assessments. In some cases, though, the likelihood of a pest infestation may be overstated by the industry. Furthermore, the application of health and sanitary risk management measures or other standards by governments may be overly trade restrictive. In these cases when industry concerns are dominant, there may be a net social cost with the adoption of a TB.

Tariffs and TBs can be implemented to moderately or severely alter relative prices and trade. TBs to protect human, animal, and plant health can vary across countries. In some cases, a complete ban on trade is imposed because no available treatment methods are considered adequate given an acceptable level of risk. In other cases, negotiation can yield scientific standards that permit trade while maintaining acceptable risk levels for plant and animal protection. For example, chlorine dip to control fire blight bacteria is acceptable in some countries, while others still prohibit imports. TBs can be further refined by imposing varietal or regional restrictions rather than national restrictions.

Even in the instances where countries have agreed upon scientific standards, trade still may not occur because of the cost of compliance. U.S. Red and Golden Delicious producers will not export to Japan in 1997/98 because of the costly phytosanitary requirements. Similarly, Northeast producers have not pursued the on-site inspection required to access the Mexican market.

Tariffs and TBs alter relative prices between world and national markets. To compare the effects of the two types of policies, we estimate a tariff rate equivalent of the TBs. To see how this affects international trade, consider a simple case. Suppose a small country importer at first does not impose any border measure. Assuming no storage, the country will import the difference between consumer demand (D) and producer supply (S) (figure B-1). At a world price of WP, the small country will import QD less QS. Now, suppose the small country imposes a tariff, raising the domestic price to DP. At this higher internal price producers supply more to the market and consumers purchase less so that the market equilibrates where domestic production equals consumption. There is no longer any trade. The tariff has created a price wedge sufficient to raise prices and eliminate excess demand. Of course, most tariffs are not so large as to completely eliminate trade.

Now, consider a TB (vis-a-vis all exporters) that prohibits apple imports because of phytosanitary concerns. The economic effect is exactly the same as the tariff. In essence, a price wedge or a tariff rate equivalent is created between the global market and the small country.[4] Again, a TB protocol can be so prohibitive as to cut off trade completely, as in the case of apples to Japan, or it can have a more limited effect as in the case of U.S. exports to Mexico. In the Japanese case, the cost of phytosanitary requirements is at least large enough to just eliminate trade, raising the price to DP where Japanese demand equals supply. The TB tariff rate equivalent may actually be even higher, but that additional cost is not observable beyond DP since the impact on the Japanese market is identical to the rate that just eliminates trade. The implication is that a prohibitive TB can be relaxed but still be sufficiently stringent to eliminate trade. For example, the U.S.- Japanese agreement on a protocol to allow importation of Red and Golden Delicious apples generates a U.S. traded price that intersects at or above where supply equals demand, so that the U.S. apple industry still does not find it economical to trade in the 1997 marketing year. The three countries considered in this study all have tariffs and TBs that constrain trade.

Empirical Analysis of Tariffs and TBs

For our empirical analysis, we first estimate the tariff rate equivalents of TBs for Japan, South Korea, and Mexico. Then we examine the trade effects of removing tariff rates and the estimated TB tariff rate equivalents for these same countries. The tariff rate equivalents vary from year to year depending on market conditions so we use data from both the 1994/95 and 1995/96 U.S. apple marketing seasons to achieve a more realistic estimate of the impact of TBs.

To estimate the tariff rate equivalents of the TB regulations, we compare the monthly CIF prices (landed prices including freight and insurance costs) of U.S. apples in a foreign country with wholesale prices in the foreign market. We assume the price gap consists of the tariff and TB tariff rate equivalent. Monthly comparisons are made to capture the range of market conditions over a year. It is important to compare prices of a like apple (i.e., same

[4] The trade effects of a TB may differ from our simple diagram if the measure affects consumers' demand for or producers' supply of the product. For example, a country of origin label may stimulate or deter consumer demand for the foreign product.

variety, grade, and size) during the same time period and at a similar place in the marketing chain.

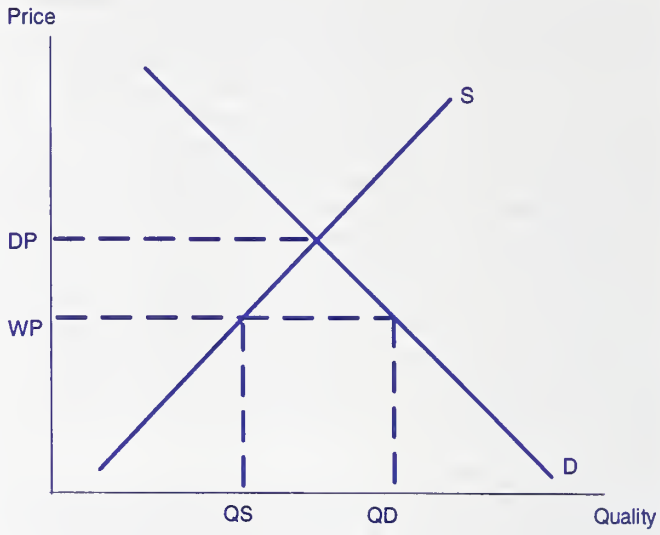
Fuji apples were chosen for comparison for Japan and South Korea since Fuji apples are the most important variety grown in both countries. For Japan, we chose to estimate the effects of TBs on the Fuji market, which is viewed as having more potential for U.S. exports, instead of the Red and Golden Delicious markets even though a protocol exists for those apples. For Mexico we used both Red and Golden Delicious apples for our comparison because these varieties dominate production there.

Wholesale prices for the specific varieties in Japan, South Korea, and Mexico come from official national market statistics. For Japan and South Korea, the prices represent average national wholesale prices. Mexican data are for the Mexico City wholesale market.

In the case of Japan, renowned for the quality of its apples, we assume the wholesale price represents very high quality apples and compare the Japanese wholesale price with the estimated CIF price for the high end of the price range reported by USDA's Agricultural Marketing Service (AMS) for Washington Extra Fancy Fuji apples.[5] For South Korea, which also produces very high quality apples, we compare the highest price Washington Extra Fancy Fuji apples with Korean medium quality Fuji apples.[6] For both Japan and South Korea, we select size 72, the largest size for which we have data, because consumers in those countries prefer larger sizes.

The average Mexican apple is thought to be lower in quality than the average U.S. apple. We use either Washington or U.S. Fancy grade apples for comparison with the Mexican wholesale prices in the September-December period when Mexican production dominates the market (only 19 and 8 percent of U.S. exports to Mexico occurred during this period during the 1994/95 and 1995/96 seasons, respectively).[7] During the January-August period imports dominate the Mexican market and we use an average of

Figure B-1
Price Effects of Barriers to Trade



Washington Extra Fancy and the Fancy qualities used in the September-December period. Mexican consumers prefer smaller apples so we use size 100s for the Mexican comparison.

To estimate the price of a U.S. apple in a foreign wholesale market we use Washington FOB prices and add estimates of insurance and transportation costs to Tokyo, Seoul, and Mexico City. Data from AMS and industry estimates are used for these transport costs.[8] We do not have data on internal transactions costs for Japan and South Korea so we understate the costs of bringing a U.S. apple to the foreign wholesale market where apples must move from the port to a wholesale market. For Mexico, apples are trucked directly to the wholesale market so the transportation costs are accounted for although marketing costs are still unknown.

Once the difference in price between the U.S. apple delivered in the foreign country and the wholesale price for a similar apple in the foreign wholesale market is known, the monthly price wedge (in percentage terms) is calculated. The monthly price wedge is divided into the known tariff rate and the TB tariff rate equivalent, which is the residual. The annual TB tariff rate equivalent is the simple average of monthly rates for those months with U.S. apples on the market (October-July for Fuji apples and August-July for Red and Golden Delicious apples).

Table B-4 shows the tariff rates and TB tariff rate equivalents for the three countries. Average annual tariff rates ranged from 49.7 percent for Korea to 17.5 percent for

[5] U.S. federal grades are based on color, shape, firmness, blemishes, and other factors. The Washington State apple industry created additional grades, Washington Extra Fancy and Washington Fancy. The major Federal and Washington grades for export range from U.S. Number 1, U.S. Fancy, Washington Fancy, U.S. Extra Fancy, and Washington Extra Fancy.

[6] For both the 1994/95 and 1995/96 seasons, AMS data on Extra Fancy Washington Fuji apples are only available for regular storage apples, not controlled atmosphere apples, which means the time series ends midway through the season. To complete the time series, we use data from the Washington Growers Clearing House Association (WGCHA) on average monthly prices for all Fuji apples as a basis to estimate a price for Washington Extra Fancy apples during the controlled atmosphere storage part of the season. An average premium is estimated from the AMS and WGCHA data during the regular storage season. This premium is used with the average monthly WGCHA prices for all Fuji apples during the latter part of the season to attain estimates for the higher quality Fuji.

[7] For Red Delicious we use Washington Fancy grade (no data are available from AMS in either year for U.S. Fancy). For Golden Delicious we use U.S. Fancy in 1995/96 and Washington Fancy in 1994/95 because no other data are available. As in the case of Fuji prices, Golden Delicious Washington Fancy prices for the 1994/95 season are only reported for regular storage. We use the Washington Growers Clearing House data on all Fancy Golden Delicious prices to estimate the rest of the time series for Washington Fancy apples.

[8] For Japan and South Korea, we use AMS data on shipping costs based on Red and Golden Delicious trade to Japan. Adequate data are not available on appropriate shipping costs to Korea, so we use the Japanese costs. Although South Korea is a longer shipping distance, Japanese port costs are particularly high, so the bias due to using Japanese shipping costs is unknown. Industry estimates of shipping costs are used for Mexico.

Table B-4--Tariff and TB rates and associated changes in imports with elimination of trade barriers

	Tariff rate	TB rate	TB+ tariff rate 1/	Elasticity		Increase in imports with the elimination of			
						TB		TB+Tariff	
				Demand	Supply	Quantity	Value	Quantity	Value
	--Percent--					1,000 metric tons	Million $	1,000 metric tons	Million $
Japan--Fuji									
1994/95	19.8	58	78	-0.3	0.1	56	99	75	132
				-0.2	0.1	42	74	56	99
				-0.3	0.0	42	74	56	99
				-0.2	0.0	28	49	38	66
1995/96	19.3	24	43	-0.3	0.1	31	60	57	109
				-0.2	0.1	24	45	43	82
				-0.3	0.0	24	45	43	82
				-0.2	0.0	16	30	28	54
Korea--Fuji									
1994/95	49.7	4	54	-0.3	0.1	5	8	62	109
				-0.2	0.1	3	6	46	82
				-0.3	0.0	3	6	46	82
				-0.2	0.0	2	4	31	55
1995/96	49.2	0	49	-0.3	0.1	0	0	124	238
				-0.2	0.1	0	0	93	178
				-0.3	0.0	0	0	93	178
				-0.2	0.0	0	0	62	119
Mexico--Red Delicious									
1994/95	18.0	20	36	-0.3	0.1	10	5	19	10
	(16)			-0.2	0.1	8	4	14	7
				-0.3	0.0	8	4	15	8
				-0.2	0.0	6	3	10	5
1995/96	17.5	13	29	-0.3	0.1	7	4	15	10
	(16)			-0.2	0.1	5	3	11	7
				-0.3	0.0	5	4	12	8
				-0.2	0.0	4	2	8	5
Mexico--Golden Delicious									
1994/95	18.0	52	68	-0.3	0.1	34	16	44	21
	(16)			-0.2	0.1	25	12	32	15
				-0.3	0.0	27	13	35	17
				-0.2	0.0	18	9	24	11
1995/96	17.5	11	27	-0.3	0.1	9	7	21	16
	(16)			-0.2	0.1	7	5	16	12
				-0.3	0.0	7	5	17	13
				-0.2	0.0	5	4	12	8

1/ For Mexico, not equal to the sum of the tariff rate and TB tariff rate equivalent shown because the tariff is a percent of the value of apples at the United States-Mexico border, and the TB tariff rate equivalent is a percent of the price of apples when they arrive in Mexico City. The tariff rate as a percent of the Mexico City price is presented in parentheses.

Mexico.[9] TB tariff rate equivalents vary between years and within years. The variation reflects changes in market conditions and tariffs rather than changes in phytosanitary requirements. The magnitude of the TB tariff rate equivalent reflects phytosanitary import requirements and the importer's and the exporter's market conditions. For example, the 1994/95 season produced a record U.S. apple crop, lowering U.S. apple export prices and generating larger TB tariff rate equivalents than in the 1995/96 season. In a closed or relatively closed apple market like South Korea and Japan, internal prices can vary substantially from year to year depending on production. Because the TB tariff rate equivalent can vary so much from year to year, a longer time series of price data would provide a more meaningful estimate of the average economic effect of a TB.

In 1994/95 the Japanese TB tariff rate equivalent was 58 percent but in 1995/96 it was 24 percent (Japanese and South Korean TB tariff rate equivalents, like *ad valorem* tariffs, are measured as a percent of the estimated CIF value). In 1995/96, the TB tariff rate equivalent was 72 percent in September, 0 from October through March, and averaged 48 percent from April through July. Less than 1 percent of the season's production was marketed in Septem-

[9] In Japan, the tariff rate varies by fiscal year which starts in April. The tariff was 20 percent in fiscal year 1994, 19.5 percent in 1995, and 19 percent in 1996. South Korea's tariff rate was 50 percent in calendar year 1994, 49.5 percent in 1995, and 49 percent in 1996. Before NAFTA, the Mexican tariff on apples was 20 percent. With NAFTA, the tariff varies over the course of the year. The preferential NAFTA tariff was 18 percent in calendar year 1994, 16 percent in 1995, and 14 percent in 1996. However, U.S. imports at the preferential NAFTA tariff are limited. The tariff rate quota for fresh U.S. apples was 55,000 metric tons in 1994 and increases at a 3-percent compounded annual rate. Over-quota apples enter at the lower of Mexico's 1993 or current Most Favored Nation duty at the time of the over-quota imports. U.S. apple exports to Mexico have exceeded the tariff rate quota every year.

ber. In some months, the estimated U.S. CIF price plus the tariff is more than the Japanese wholesale market price, i.e., no trade would occur even without a phytosanitary restriction because the tariff alone is sufficient to eliminate trade. In those cases the TB tariff rate equivalent is equal to zero.

South Korea's tariff rate for apples is very high and with such a large tariff, the TB tariff rate equivalent is not always positive. The TB tariff rate equivalent was 4 percent in 1994/95 when using the medium quality Korean Fuji apple. If using the high quality Korean Fuji apple, the TB tariff rate equivalent would have been 11 percent. In 1995/96, Korea had a very large crop and the United States had a short crop. As a result, average prices in South Korea were lower than the prices of U.S. apples if they could have been delivered to South Korea.

For Mexico, the TB tariff rate equivalents for Red Delicious and Golden Delicious are quite similar for the 1995/96 season at 13 and 11 percent, respectively. During the 1994/95 season, the estimates vary dramatically. The Red Delicious TB tariff rate equivalent is 20 percent and the Golden Delicious TB rate is 52 percent. During the early part of the season there is a large price spread between U.S. and Mexican prices. U.S. producers cannot ship apples to Mexico until the apples have completed the cold treatment, so the only U.S. exports during those months are a very limited number from the previous season. During the rest of the season, exporters must still comply with phytosanitary requirements and tariffs, but the length of cold treatment is not a constraining factor to trade. In the 1994/95 season, the TB tariff rate equivalent for Red Delicious was 32 percent during the September-December period and 13 percent during the rest of the year. For Golden Delicious the TB tariff rate equivalent was 76 percent during the fall period and 40 during the rest of the year. This pattern of a higher TB rate during the fall was not repeated in the 1995/96 season for either variety.

Finally, we estimate the value of trade that would have occurred if there were no tariffs and TB requirements were harmonized to current U.S. systems approaches to pest management. Before discussing the results, the estimates require some explanation and discussion of the simplifying assumptions used. Harmonizing phytosanitary requirements means meeting current U.S. systems approaches to pest management that are adequate for exports to most countries (commercial production practices, grading and sorting, and visual inspection). It does not mean meeting the additional costs associated with the more demanding Japanese and Mexican import requirements. When TB tariff rate equivalents are eliminated, the standard U.S. practices are continued without any additional costs of compliance.

To attain results, we make assumptions regarding the responsiveness of demand and supply to changes in domestic price in the importing countries. We assume a demand elasticity of -0.2 and -0.3. That is, for every 1-percent decrease in price, consumers in each importing country respond by increasing the quantity demanded by 0.2 to 0.3 percent. We further assume a supply elasticity of 0.0 and 0.1. That is, producers respond to a 1-percent decrease in price with either no change in supply or a 0.1-percent decrease. Grower response would be greater over several years as more time would allow for planting new trees and maturation. The responsiveness estimates are based on a limited literature review.[10] We also assume that an increase in import demand for each country does not affect world prices. Furthermore, we limit our calculations to changes in Fuji imports for Japan and South Korea, and changes in Red and Golden Delicious imports for Mexico.

Table B-4 presents the range of results for the removal of the TB tariff rate equivalents and for the removal of both the tariffs and TB tariff rate equivalents. The estimated changes in trade are substantial. The average estimate (average of the four combinations of supply and demand elasticities) for the increase in imports, from all sources, of the three countries if both the tariff and TBs are eliminated equals $205 million and $280 million for the 1994/95 and 1995/96 seasons, respectively. The increase in imports is equivalent to 49 and 77 percent of the value of U.S. apples exports in the 2 years. Removing both the tariff and TB tariff rate equivalent would have led to an average increase in Japanese and South Korean imports of Fuji apples, from all sources, of 102,000 metric tons in 1994/95 and 136,000 metric tons in 1995/96. U.S. Fuji production in 1995/96 totaled 199,939 metric tons, although production is increasing rapidly. The increase in Japanese and South Korean Fuji imports and Mexican Red and Golden Delicious imports would have been equal to 5, 16, and 6 percent of the 1995/96 consumption in each country, respectively. The removal of only the TB tariff rate equivalent yields a mid-range estimate of $97 million for 1994/95 and $53 million for 1995/96.

Conclusions

While global markets have experienced a substantial increase in the value of apple trade, large tariffs and TBs limit the market for expansion. We find that tariffs and TBs create price wedges that reduce imports or potential imports. Based on 1994/95 and 1995/96 data, we estimate that Japan, South Korea, and Mexico would have substantially increased their imports of apples if tariffs and TB tariff rate equivalents were both eliminated. The mid-range estimate of the increase is $205 million in 1994/95 and $280 million in 1995/96. If only TB tariff rate equivalents were removed—trade is harmonized to U.S. systems approaches to pest management—the corresponding estimates would equal $97 million in 1994/95 and $53 in 1995/96. These results indicate that TBs have significant effects on trade. This further suggests that trade liberalization discussions must consider harmonization of phytosanitary requirements.

Deriving our estimates required a number of simplifying assumptions and therefore the results should be interpreted as approximate, not exact. Some assumptions may lead to

[10] Cho and Cho estimated an own-price elasticity of demand for Korean apples of -0.2. Also Huang estimates a complete price and expenditure system for specific U.S. fruits and finds a 0.2 decrease in demand with a 1 percent increase in apple prices. On the supply side, Baumes and Conway estimate a price elasticity at the farm level of .007 for fresh apples.

overstating our estimates. First, we assumed that world prices are not affected by the changes in imports. The estimated large increases in imports by these three countries, however, would likely have an impact on world prices. If world prices rose, exporting countries would benefit from the higher prices but potential export sales volume would fall. Second, we may have overstated the price differentials. To the extent that Japanese and South Korean Fuji apples are of higher quality than the top Extra Fancy Washington State Fuji apples, the price differentials reflect quality differences rather than a technical barrier. In the case of Mexico, which produces and imports a wide range of apple qualities, our assumption regarding the quality of apples in the wholesale market may be inadequate. Additionally, our price differential calculations did not fully reflect the transaction costs of moving U.S. apples from the foreign country border to wholesale markets. Third, insular Japanese and South Korean apple industries do not necessarily face incentives to improve marketing channels and adopt technological innovations. With fewer trade barriers, these apple industries would have incentives to reduce costs and compete with international traders. Fourth, we have implicitly assumed that other, perhaps new, regulatory measures and marketing procedures would not limit trade.

There are at least three reasons why our estimates may understate import penetration if tariffs and TBs were eliminated. First, we considered only a short-run supply response to an opening of the Japanese, South Korean, and Mexican markets. In a medium- to long-run outlook, exporters will respond to higher prices in foreign markets by increasing plantings. This may be particularly true for Fuji and other new varieties, as production in the United States is still relatively small. Production of new varieties of apples is currently increasing in the United States and other countries, as producers respond to changes in consumer taste. Second, our TB tariff rate equivalent estimates represent the minimum price difference created by a regulatory measure, the price difference that just eliminates trade. TB tariff rate equivalents could be greater than our estimates in the cases of prohibitive measures. Third, we have not considered substitution across varieties. To the extent that foreign consumers are willing to purchase other varieties than we considered, exporters would have more market opportunities.

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